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**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

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In re Petition of Frescati Shipping Company,  
Ltd., as owner of the M/T ATHOS I, and  
Tsakos Shipping and Trading, S.A., as  
Manager of the ATHOS I, for Exoneration from  
Or Limitation of Liability

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Civil Action No. 05-CV-305

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UNITED STATES OF AMERICA,  
Plaintiff,

Civil Action No. 08-CV-2898

v.  
CITGO ASPHALT REFINING COMPANY,  
CITGO PETROLEUM CORPORATION, and  
CITGO EAST COAST OIL CORPORATION,  
Defendants.

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**PRE-HEARING BRIEF OF PLAINTIFFS  
FRESCATI SHIPPING COMPANY, LTD.  
AND TSAKOS SHIPPING & TRADING, S.A.**

This Pre-Hearing Brief on liability is submitted on behalf of Plaintiffs Frescati Shipping Company, Ltd. and Tsakos Shipping & Trading, S.A., the owner and manager of the Motor Tanker ATHOS I (collectively, “Frescati”).

This Brief is intended to give the Court an overview of the relevant facts, the legal issues to be decided, and a summary of the evidence that will be presented at trial. As the evidence is being received during the course of trial, this Brief might provide context and a road map that could inform the Court of where particular pieces of evidence fit into the larger picture.



## **I. INTRODUCTION**

As the Court is by now well aware, this case arose from an oil spill that occurred on November 26, 2004, when ATHOS I's hull was twice pierced by an abandoned anchor that sat on the floor of the Delaware River as she approached the oil terminal owned and operated by Defendants (collectively "CARCO")<sup>1</sup> in Paulsboro, New Jersey, as ATHOS I was pushed slowly by tugs sideways from the up-river channel across the southern tip of federal anchorage no. 9.

Frescati incurred over \$143 million in clean-up costs, hull damage, lost revenue, and other damages. Following investigations by the Coast Guard and the National Pollution Fund Center ("NPFC"), the Government permitted Frescati to limit its strict liability and reimbursed about \$88 million of its clean-up costs pursuant to the Oil Pollution Act of 1990. 33 U.S.C. § 2701, *et seq.* Limitation of liability would not have been permitted if Frescati had been grossly negligent or violated any federal "safety, construction, or operating regulation." 33 U.S.C. § 2704(c)(1)(B).

This is an admiralty action, pursuant to 9 U.S.C. § 1333(1). Frescati estimates the bench trial will require 21-25 days. Its witness list was filed on January 15, 2015. Its exhibit list and a Brief on Damages will be filed with this Brief.

Following a previous bench trial and an appeal, certain legal errors and a dearth of findings of fact necessitated this remand to find facts explicitly assigned by the Third Circuit. *In*

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<sup>1</sup> CITGO Asphalt Refining Company was the owner of the terminal and the sub-charterer of the vessel. It is a New Jersey general partnership, whose general partners are CITGO Petroleum Corp. (90% partner and managing partner) and CITGO East Coast Oil Corp. (10% partner). By Stipulation and Order dated Sept. 30, 2005 (Doc. No. 60), each was deemed a party to this action in its individual capacity. Judgment is sought against the partnership and each of the partners jointly and severally.

*re Frescati Shipping Co.*, 718 F.3d 184 (3d Cir. 2013). This trial is to determine those specified facts.

Frescati has asserted two causes of action against CARCO. It has brought a contract claim for breach of the safe port and safe berth warranties contained in the sub-charter party contract (by virtue of the fact that the ship is named in the sub-charter and, as owner, Frescati benefits from the warranty contained therein), and it has brought a tort claim alleging that CARCO was negligent and breached its duty of care, as a wharf owner, or wharfinger, to use reasonable diligence in assuring that its berth and the approaches to it were in a reasonable condition of safety for ships coming to and lying at the wharf.

At the conclusion of the upcoming hearing under Rule 63, the evidence will demonstrate: (1) that Frescati proceeded prudently, in reasonable reliance on the safe port/safe berth warranty and the invitation to enter the berth; (2) that the port and berth were unsafe, and thus, the agreed allocation of risk, as well as the terminal operator's obligation to exercise due care, the allocation of risk that CARCO had assumed, requires it to bear all of Frescati's losses.

**A. As To The Breach Of Warranty Claim**

The Court of Appeals has already set forth the material conclusions of law on the breach of warranty claim. Most importantly, it held Frescati is the beneficiary of the sub-charter party's safe port and berth warranty, 718 F.3d at 199, and "the safe berth warranty is an express assurance made without regard to the amount of diligence taken by the charterer." *Id.* at 203. It is "an explicit assurance of safety." *Id.* at 198. The warranty applies to known and unknown hazards. *Id.* at 203 n.18.

The evidence will demonstrate that:

(1) Under the sub-charter party, CARCO warranted that ATHOS I could safely proceed to CARCO's Paulsboro terminal;

(2) The vessel, drawing only 36'07", was proceeding on the flood current to the CARCO terminal at the time that CARCO had ordered her in, and was doing so in compliance with all local piloting guidelines, including the agreement in place between the docking pilots and CARCO itself;

(3) The ship's draft was 36' 7" on arrival at Paulsboro as demonstrated by the wealth of evidence in the record. By contrast, the height of the anchor above the river bed, and the precise depth of the water where the anchor was lying, *at the time the ship hit it* are unknown and therefore it is impossible for CARCO to prove the ship's draft based upon the position of the anchor at the time of the casualty.

(4) The unknown and uncharted abandoned anchor, which holed ATHOS I, rendered the port unsafe, thus putting CARCO in breach of the safe port warranty; and

(5) The ship was prudently navigated. She was at all times where she was supposed to be, at the appropriate times and states of the tide. In particular:

(a) The Court of Appeals has already held (i) that the anchor's presence was unforeseeable (718 F.3d at 206), and (ii) in response to CARCO's attempts in the appeal to challenge the prudence of the ship's navigation (harping on the allegation that the ship should have delayed her transit up the river and across the anchorage to the berth), the Court of Appeals stated that it saw no evidence that the ship "was attempting to dock at an inappropriate time." (*Id.* at 204 n.22);

(b) The Coast Guard found no fault on the part of the vessel or her officers or crew, did not issue any citations, and, in fact commended Frescati for its cooperation

and

(c) The NPFC reimbursed Frescati for about \$88 million in clean-up costs, which it could not do unless it first found, among other things, that the ship did not violate any regulatory safety, construction or operational requirements.

At the end of the evidence, it will be clear that CARCO should be held solely at fault for its breach of the safe port/safe berth warranty.

**B. As To The Terminal Operator's Negligence Claim**

The Court of Appeals has already held that the offending anchor was in the “approach” to CARCO’s berth. 718 F.3d at 209-10. The Third Circuit expressly followed the Supreme Court’s decision in *Smith v. Burnett*, 173 U.S. 430, 433 (1899), which holds that a terminal operator has a duty to ascertain the conditions in the approach to its berth and either remove hazards or warn mariners of their presence. 718 F.3d at 207.

As a matter of evidence, CARCO has admitted that it did absolutely nothing to carry out its duty to inspect and warn. Most importantly, the Third Circuit has already determined that “[CARCO] never specifically searched for debris or other hazards.” *In re Frescati Shipping Co.*, 718 F.3d at 194. CARCO’s failure to carry out its duty to search thus has already been decided and cannot be re-visited in the upcoming trial. The evidence already before the Court demonstrates (a) that reasonable means, at a reasonable cost, were available to CARCO to search the approach to its berth for hazards to navigation, and (b) that the abandoned anchor was readily detectable (if CARCO had bothered to look).

In addition, in 1999 CARCO persuaded the docking pilots association to expand the time available for docking ships at CARCO’s Paulsboro terminal – i.e., opening wider the so-called “docking window.” This agreement saved CARCO substantial money over the years in demurrage fees – the costs due under the various charters for delay attributable to the charterer –

as the Third Circuit recognized, finding that “the DPA [Docking Pilots Association] guidelines ... were based in part on CARCO’s desire to maximize the number of vessels that could dock at the berth.” *Id.* at 194 n.7.

Notwithstanding the five years from 1999 to 2004 in which CARCO reaped the benefit of this expanded docking window, as soon as events went awry, CARCO would have this Court accept its effort to disavow completely its agreement with the docking pilots to expand that docking window. The doctrine of estoppel prevents such crass opportunism. *First Pa. Bank, N.A. v. E. Airlines, Inc.*, 731 F.2d 1113, 1122 (3d Cir. 1984); *Gen. Elec. Co. v. MV NEDLLOYD*, 817 F.2d 1022, 1029 (2d Cir. 1987); *Indus. Mar. Carriers, Inc. v. Siemens Westinghouse Power Corp.*, No. 01-0726, 2002 WL 1767421, at \*3 (E.D. La. July 30, 2002).

The evidence already of record establishes that ATHOS I was proceeding appropriately under the docking pilots guidelines – as requested by CARCO itself – and at the time that CARCO had ordered. Thus, CARCO cannot avoid its own negligence by claiming that ATHOS I was imprudently navigated as it entered the approaches to CARCO’s berth and attempted to dock.

The above facts, taken together, compel a finding that CARCO breached its duty of care as a marine terminal operator. Had CARCO taken reasonable steps to look, it would have found the anchor, and could have warned vessels invited to its berth of this hazard. CARCO is liable for breach of the terminal operator’s duty to search for, and warn of, hazards to navigation in the approaches to its berth. As a result of its negligence, CARCO must reimburse Frescati for all its losses.

## II. SUMMARY OF THE FACTS AND ISSUES

The Third Circuit made very specific determinations with regard to the issue of the safe port/safe berth warranty given by CARCO, and how this Court should deal with this issue on remand. In particular, it held, *In re Frescati Shipping Co.*, 718 F.3d at 204-05:

If it is found that the *Athos I* was drawing 37 feet or less<sup>2</sup> and absent a determination of bad navigation or seamanship, that finding would indicate that the warranty had been breached because the ship sustained damage. What, if anything, under the water may have caused that margin to be diminished is therefore immaterial. It could have been the remnants of a shipwreck, a range of rocks, a jutting reef, or a shoal. In this case, it happened to be an abandoned anchor that protruded into the *Athos I*'s hull. And by its safe berth warranty, CARCO assumes liability for that damage.

The Court of Appeals used the term “safe berth warranty” to include the safe *port* warranty as well. 718 F.3d at 189, 197. In this case, the two are coextensive. The safe berth warranty includes the approach to the berth. The safe port warranty covers the port, which encompasses the area of the anchorage where the ship was injured, as CARCO’s counsel conceded at oral argument. *Id.* at 200 n.12, 203. We shall use the term “safe port warranty.”

CARCO argues the mere occurrence of a casualty does not prove a port is unsafe. Issues Br. at 5.<sup>3</sup> However, as quoted above, if the ship struck the anchor while proceeding on a proper draft, then, absent bad seamanship, the port was unsafe for ATHOS I. If CARCO contends vessel negligence was the cause, it must carry the burden of proving it. The *only* negligence that

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<sup>2</sup> The Third Circuit held the issue of a 37’ draft qualification on the safe port warranty is a question of fact for this remand. *Id.* at 204 n.20. Although the court perceived the existence of such an issue, none of the parties did. No one argued for a 37’ draft qualification on the warranty at trial or on appeal, or discussed any evidence on such a point. In fact, there was no such qualification at the discharge port, *infra*. However, that need not be decided if this Court determines ATHOS I’s draft was 37’ or less. The uncontroverted evidence shows the ship’s draft was in fact 36’ 7”, and CARCO’s argument that it somehow became greater is entirely speculative.

<sup>3</sup> “Issues Br.” Refers to CARCO’s Brief on the Legal Issues Relating to Liability Following Remand, dated July 15, 2014 (ECF No. 713).

could have caused the accident if the anchor was too deep to be a hazard would have been proceeding through the anchorage on an unsafe draft, or at too low a depth of water, or with excessive “squat” due to excessive speed. Squat is the bodily sinkage of a vessel caused by a ship’s movement through water. Contrary to CARCO’s statement, Issues Br. at 16, squat does not increase a ship’s draft, but rather, if squat takes place, it lowers the water level around the vessel, placing her closer to the river bottom. *The Mariner’s Handbook* § 2.104, at 46 (8th ed. 2004). Squat is proportional to speed; the greater the speed, the more a ship squats in the water. In this case, at the bare headway ATHOS I made as she moved across the anchorage, being slowly pushed by tugs, “squat had nothing to do with it,” as CARCO’s expert witness acknowledged. (*Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8<sup>l</sup>*).

The two primary facts that require determination by this court are: 1) What was the ship’s draft when she contacted the anchor? *In re Frescati Shipping Co.*, 718 F.3d at 204, 215; and 2) Was there any causal bad navigation or seamanship? *Id.* at 204-05 & n.22.

**A. What was the ship’s draft when she contacted the anchor?**

“Draft” is the distance from the surface of the water to the bottom of the ship. ATHOS I’s draft was 36’ 7” at the time of the incident, as calculated and confirmed by several methods. CARCO’s expert naval architect witness, George Petrie, agreed this was the draft, based on the weights of the vessel herself, and of the cargo, fuel oil, water, stores, crew, etc., reported to be on board. He also had an alternate theory that the draft at the time of the incident may have been as much as 36’ 10” at the time of the incident due to the hypothesized presence of unrecorded ballast water, but this was based on two fundamental errors, discussed hereafter. Even so, this alternate theory does not put the ship’s draft as deep as the 37’ level mentioned by the Third Circuit.

While agreeing the *evidence* of the weights on board the ship shows that her draft was less than 37' *at the time of the incident*, CARCO nonetheless speculates that, *unknown to the crew*, more river water than even Petrie hypothesized somehow got into the ballast tanks and made the draft greater. Even more far-fetched, the crew supposedly discovered this “extra ballast” after the casualty and then *secretly* pumped it out under the noses of the Coast Guard and other investigators on board. Issues Br. at 35-36. All the objective evidence shows there was no such extra ballast, corroborating the crew’s testimony that the ballast tanks were sounded immediately before the up-river voyage and immediately after the casualty, and were all empty (except for the no. 7 port and starboard tanks, where the crew had taken 510 tons of ballast before the start of the river voyage to level the ship’s trim).

First of all, it was impossible for ballast water to get on board without manually opening the sea valve and two additional manual valves in the pump room, or to flow into the ballast tanks without running the hydraulic pump to open the ballast system valves. But even if that had been possible, there was no change in the ship’s fore-aft trim and no list to port or starboard before the accident, as would be expected from the random distribution of ballast water finding its way in. Further, the ship’s echo sounder readings were checked regularly, and always showed more than adequate clearance between the ship and the river bottom.

After the accident, no remnants of any alleged extra water were found in the ballast tanks by the numerous independent inspectors on board, including the Coast Guard. As the ship then was down by the bow and had a 6° to 7° port list, there would have remained a wedge of water at the forward ends and downward-listing sides of the ballast tanks where the pump suction could not reach, if the crew had pumped out any alleged ballast. That water would have been evident when the trim and list were removed and it ran back under the sounding points on deck.



CARCO's extra-ballast theory does not profess to show what the ship's draft was, or that it was at an unsafe level, as it does not purport to specify the amount of any alleged extra ballast. The theory is merely the supposed explanation *why* the draft would have been greater than both experts calculated, but CARCO looks elsewhere to try to prove the draft was in fact greater. CARCO asks the court to infer the ship's draft was greater than 37' from its highly contested allegation that the uppermost point of the anchor was deeper than that. Issues Br. at 28.

While there is a great deal of direct evidence regarding the ship's draft, showing it was 36' 7", there is no direct evidence about the position in which the anchor lay (*i.e.* horizontal or angled upward), its uppermost height above the river bed, and the topography of the river bed where the anchor lay, and, therefore, the actual depth of water above it at the time and place of the accident. It must be emphasized that it is CARCO, not Frescati, who, as the proponent of its sharply contested affirmative allegations regarding the anchor's attitude, height, and depth, must carry the burden to prove its allegations.

**B. Was there any causal bad navigation or seamanship?**

CARCO seems to argue that Frescati must affirmatively prove it was not *possible* to avoid the anchor, as an element of the definition of a safe port, *i.e.* a port that is free from dangers that cannot be avoided by good seamanship. Issues Br. at 6. The Third Circuit, however, did not hold Frescati must prove a negative. It held the trial court must find whether there was bad navigation or seamanship. It is CARCO, as the proponent of such an allegation, who must bear the burden of proving it. CARCO's Answer to Frescati's Complaint asserted vessel negligence and unseaworthiness as an affirmative defense, and a defendant has the burden of proving its affirmative defenses. Doc. 23, at Fourth Separate Defense, p. 10. *Alexander Hamilton Life Ins. Co. v. Virgin Islands*, 757 F.2d 534, 541 (3d Cir. 1985).

The oil spill was investigated by the Coast Guard, the NPFC, the Department of Justice, the State of New Jersey, and the ship's Flag State, none of whom leveled any civil or criminal charges against Frescati, ATHOS I, or her crew or pilots. The NPFC permitted the vessel to limit her strict liability for clean-up costs.

It should be self-evident that the only kind of bad seamanship that could have caused the ship to strike the unknown anchor, if it were so deep as not to be a hazard, would have been approaching on an unsafe draft or with excessive squat, both discussed above, or at too low a water depth. A finding that ATHOS I approached CARCO's terminal on a safe draft, with little or no squat, and at an appropriate stage of tide would both: 1) constitute good seamanship; and 2) demonstrate that the exercise of good seamanship could not avoid the unknown anchor.

The stage of tide, together with draft and squat, if any, and the depth of the water at any given location, determines the clearance between a ship's bottom and the river bottom, known as "under-keel clearance" or "UKC." ATHOS I turned from the up-river channel into the anchorage to approach the terminal after the commencement of the flood (or incoming) tidal current. This complied with the guidelines agreed between the local Docking Pilots Association and CARCO, for ships approaching with a draft up to 37' 6" (nearly a foot greater than ATHOS I). Those guidelines were adopted after much consideration in response to CARCO's own request in 1999 to broaden the stages of tide when the Pilots would consider it safe to cross the anchorage to its terminal. *In re Frescati Shipping Co.*, 718 F.3d at 195, 203 n.7.

The Third Circuit said: "CARCO argues that the vessel's master and the navigation officer believed they were docking at high tide, and in fact were not (as the tide at the time of the accident was rising but an hour removed from the low tide). However, we find no indication in

the record that the *Athos I* was attempting to dock at an inappropriate time.”<sup>4</sup> *Id.* at 204 n.22.

The Third Circuit remanded CARCO’s wholesale allegations of unseaworthiness and negligence, but it remains for CARCO to explain how the vessel could have *caused* the accident if the draft was 36’ 7” (or up to the safe draft of 37’ 6” for the docking window agreed between the Docking Pilots Association and CARCO), there is no indication the ship “was attempting to dock at an inappropriate time,” and “squat had nothing to do with it.”

A draft of 36’ 7” conformed to CARCO’s Voyage Instructions. As the Third Circuit wrote: “[I]f the ship reasonably complies with the order and proceeds to port, the charterer is liable for any damages sustained.” *Id.* at 202 (quoting 2 T. Schoenbaum, *Admiralty and Maritime Law* § 11-10, at 432-33 (5th ed. 2011)).

CARCO argues that flood current had not yet begun when ATHOS I entered the anchorage, so she should not have entered. However, it cites only the testimony of its tide expert, George Cole, who in fact deferred to the River Pilot and Docking Pilot, who *saw* the flood current had begun. Moreover, the requirement of flood current is relevant only to a ship’s maneuverability, not UKC. Obviously, water depth is at its lowest point near the start of the rising tide. However, water depth was not the issue here. Docking Pilot Bethel testified he could not have turned the ship around if the flood current had not begun, and no CARCO expert contradicted him.

CARCO also seeks to make much of the fact that the actual tide was lower than predicted, and the water level when the ship entered the anchorage was 2.4 *inches* lower than the charted MLLW depth, according to Cole. “MLLW” is “mean lower low water.” It is the average of the lower of the two daily low tides over a 19 year period, and is the depth sounding entered

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<sup>4</sup> Underscoring throughout this memorandum is added by us.

on navigation charts, rounded down to the nearest whole number. Changes in tide are added to or subtracted from the MLLW soundings on the charts to calculate the depth of water at any specific time. Both sides' tide experts agreed that, as MLLW is an average, it is normal and common for tides to be lower than MLLW. Both the River Pilot and Docking Pilot said the tide was normal that day. A difference of 2.4 inches did not decrease the clearance between the ship's bottom and the river bed to an unsafe degree.

Based on both sides' expert testimony about the average depth of water around the site where the anchor was recovered, ATHOS I, on a draft of 36' 7", had under-keel clearance of at least 5', which was more than 10% of her draft. CARCO's expert witnesses agreed the ship could not be faulted if her draft was 36' 7".

On a draft of 36' 7", ATHOS I's under-keel clearance was also sufficient at the project depth of 40' at which the Army Corps of Engineers was tasked to maintain the anchorage. 718 F.3d at 194. That UKC was 3' 5", or 9.3% of the ship's draft. She also had sufficient UKC at the shallowest spot in the approach, which was 38' 7" at the relevant time, for a UKC of 2'.

Frescati's witnesses testified a clearance of approximately 5% of a ship's draft (1' 10" on a draft of 36' 7") is acceptable for a slowly maneuvering vessel, such as ATHOS I. CARCO, however, wrongly contends the standard for slowly maneuvering ships is 10% of the draft. In fact, 10% is an accepted margin for ships at transit speed, to take into account any reduction in UKC due to squat, and the risk of reasonably foreseeable obstructions on the bottom of the waterway. There was no such squat at the bare headway ATHOS I made as she was slowly pushed across the anchorage. As CARCO's expert acknowledged, "squat had nothing to do with it." (*Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8<sup>2</sup>*).

The other issues of fact identified by the Third Circuit are *alternative* avenues of inquiry that it said need not be addressed if the trial court determines the ship's draft did not exceed 37' and no bad navigation or seamanship caused the accident. Those alternative avenues are:

**C. If the ship's draft exceeded 37' or cannot be determined, what was the clearance above the anchor?**

If there was a 37' qualification on the safe port warranty, and the clearance above the anchor was 37' or less, CARCO will have been in breach of the warranty. *In re Frescati Shipping Co.*, 718 F.3d at 205, 215. To determine the clearance above the anchor, it would be necessary to know the anchor's orientation on the river bed (horizontal or angled upward), its uppermost height above the river bed, and the topography of the river bed and depth of water at which it sat, all at the *time and specific situs* of the accident. These are the facts CARCO seeks to establish to support an inference that the ship's draft was deeper than 37'. However, there is no direct evidence of any of these facts.

It was learned during pretrial discovery that the anchor had appeared on a side scan sonar survey done by the University of Delaware in 2001, but Frescati's sonar expert considers the single side scan image in that study was insufficient to determine the anchor's orientation on the river bottom, or its height above the bottom. CARCO's expert disagrees, and contends the anchor lay prone on the river bed, with its uppermost point 41" (+/- 3.5") above the river bed.

In any case, its position three years before the accident would be irrelevant. Even if the anchor was prone in 2001, its orientation could have been changed to an upward angle since then if it was jostled or snagged by another vessel's anchor or anchor chain, because it exhibited a unique phenomenon: *If set down at--or lifted up to--an angle of 30° or more, the flukes continued to rotate upward to about 65° on their momentum, lifting the flukes 6 1/2' above the river bed.* This was due to a low center of gravity because someone had cut off the anchor's shank.

Further, the anchor, which CARCO's sonar expert claimed was partially buried in the river bottom in the 2001 scan, could have been pushed or dragged out of the bottom, raising it to its full height of 55" in its prone position, which would have been high enough to contact the ship's hull.

Additionally, the topography of the river bottom on which the anchor sat at the time and precise situs of the allision, and therefore the depth of water above the river bottom, cannot be known, because the anchor was moved as much as 10' to 15' in the accident, if not before the accident during the three years following the University side scan sonar survey.

The only evidence of the anchor's height and orientation at the time of the accident is the nature of the hull damage. Frescati's experts consider the damage shows that the anchor's flukes were pointed up and out at an angle of about 65° relative to the river bed and about 6' 6" above the river bottom. (*See* attached Exhibit "A," a diagram of an anchor with its parts labelled, photograph of the culprit anchor with its dimensions superimposed<sup>5</sup>, and photographs of the anchor "flukes down" and "flukes up.") The damage shows that, as the ship moved astern and to her port side, the no. 7 port side ballast tank struck a fluke, which pierced that tank, and the anchor was then levered or rotated upward, bringing a tripping palm up to punch a round hole in the adjacent no. 7 center cargo tank. Needless to say, CARCO's witnesses disagree about what the hull damage shows regarding the anchor's orientation and height.

In any event, Frescati need not prove the anchor's depth or height to prove the ship's draft or a breach of the safe port warranty, because it has proved the ship's draft was 36' 7" by direct uncontested evidence. It is CARCO who must carry the burden of proving its affirmative

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<sup>5</sup> The anchor measured 8' long from the bottom of the crown to the tips of the flukes; 7' 9" wide from the outside edge of one fluke to the outside edge of the other fluke; and 4' 7" deep from the tips of the palms on one side to the tips of the palms on the other side.

allegation about the anchor's depth in support of its desired inference that the ship's draft changed from the 36' 7" shown by the uncontroverted direct evidence.

**D. Did CARCO negligently fail to provide a safe approach in breach of a berth-owner's common law duty? What conduct on its part would have satisfied that duty, and was a failure in that respect a cause of the casualty?**

Frescati contends that the Court should conclude that CARCO was required to satisfy its duty "of reasonable diligence in ascertaining whether the berths themselves and the approaches to them are in an ordinary condition of safety," *In re Frescati Shipping Co.*, 718 F.3d at 207, by inspecting the approach for hazards to navigation regularly using side scan sonar. CARCO could have satisfied this standard of care by annually inspecting for obstructions when it conducted its annual depth surveys each year. CARCO *never* inspected either its immediate berth area or the approach for obstructions. *Id.* at 194. CARCO's sonar expert agreed with the other experts that side scan sonar would *easily* detect a target the size of the anchor. It *was* recorded in the 2001 University scan and the post-casualty scans. Indeed, two additional significant targets were detected in the post-casualty scans within 200 feet of the anchor; a 15' long pump-casing and an 8' long concrete block (which was also recorded in the 2001 scan).

Upon finding such an obstruction on a scan, a berth owner should inform the Coast Guard or Army Corps of Engineers, and warn its invited vessels of the potential hazard so they could await high tide or take whatever measures they deemed necessary, including lightering (discharging some cargo into barges to reduce draft) refusing to enter the port. The Government would send a diver to investigate, and either remove the object or notify mariners of its presence in its weekly Notices to Mariners and on navigation charts.

**E. Was there any causal vessel negligence  
in any of the wide-ranging respects alleged by CARCO?**

This is an *alternative* line of inquiry because the *only* vessel negligence that could have caused the ship to strike the anchor would have been crossing the anchorage with an unsafe draft or squat, or at an unsafe stage of tide. If the court finds ATHOS I's draft was 36' 7", or anything up to the 37' 6" draft deemed safe by the Docking Pilots Association, there was little or no squat, and the ship commenced her approach at an appropriate stage of tide, no question of *causal* vessel negligence could arise. There would be no materiality to CARCO's wholesale allegations of negligence on the part of Frescati's shore side technical staff, every deck and engine officer on board, and both the local River Pilot and Docking Pilot.



### III. WHAT IS *NOT* AT ISSUE

The parties previously submitted to this court briefs on the remaining issues, to assist it in certifying familiarity with the record.<sup>6</sup> CARCO's 182 page brief addressed numerous points that either were never disputed, were never material, or were rendered immaterial by the Third Circuit's decision. It even reargued several points already decided by the Third Circuit. It also asserted numerous factual contentions that simply are not correct, mis-described a great deal of the previous trial testimony, and ignored its own experts' admissions. In the expectation that CARCO will maintain these contentions going forward, we will address them herein. We will refer to CARCO's "Issues Brief"<sup>7</sup> to avoid any confusion with its as yet unseen Pretrial Brief.

It is worthwhile to call the court's attention to some of CARCO's superfluous and erroneous arguments at the outset, in order to prevent the same distractions in the future from drawing the court's focus away from the genuine issues defined by the Third Circuit.

To begin, CARCO mischaracterizes Frescati's contentions in order to knock down its own straw men. Frescati has previously rejected the same mischaracterizations in the Third Circuit and the Supreme Court. These misrepresentations are as follows.

- CARCO asserts that Frescati contends a safe port warranty is unqualified, unconditional, absolute, and a blank check that makes the warrantor strictly liable as an insurer and excuses a vessel's obligation of good seamanship. Issues Br. at 5, 10, 12, 13. Frescati never said any of those things. Frescati has always acknowledged a vessel's obligation of

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<sup>6</sup> See Frescati Plaintiffs' Brief on the Remaining Legal Issues Relating to Liability Only, which is incorporated here by reference. ECF Document No. 716, filed on August 15, 2014.

<sup>7</sup> CARCO's "Issues Brief" can be found at ECF Doc. No. 716 filed on August 15, 2014.

good seamanship, and affirmatively showed that the warranty is not absolute, because a vessel's causal negligence can cause an apportionment of damages. It was Frescati who asked the Third Circuit to remand for findings on CARCO's allegations of unseaworthiness and vessel negligence. In contrast, CARCO argued these unresolved fact issues in the appellate briefs. Frescati also acknowledged other exceptions to the safe port warranty, such as the exception for abnormal events and the "named port exception," which the Third Circuit has held are inapplicable in this case. *In re Frescati Shipping Co.*, 718 F.3d at 200, 204 n.22, 205-06.

- CARCO asserts that Frescati contends a ship can ignore Coast Guard regulations and its navigational responsibilities, and *instead* rely on local Mariners Advisory Committee ("MAC") advisories, the Docking Pilots Association guidelines, and CARCO's performance of its duties. Issues Br. at 21, 80, 81, 157. It is not sensible to suggest Frescati or any ship-owner would contend it may ignore Coast Guard regulations or its navigational responsibilities. As previously stated, the Government permitted Frescati to limit its strict liability because it found no regulatory violations.

The exercise of good seamanship *includes* reliance upon local advisories and Pilots' guidelines, which inform the customary safe practices at a port. These serve *in addition to* regulations and are part of ordinary care, not *in lieu* of them. Reliance on local Pilots and customary practices *is* good seamanship, absent reasons to believe the Pilots or practices are wrong. "The master is entitled to assume that the pilot is an expert on local conditions and practices, until it becomes manifest that the pilot is steering the vessel into danger." *Avondale Indus., Inc. v. Int'l Marine Carriers, Inc.*, 15 F.3d 489, 493 (5th Cir. 1994). As stated in the iconic English safe port case cited by the Third Circuit, *Leeds*

*Shipping v. Societe Francaise Bunge (The Eastern City)*, [1958] 2 Lloyd's Rep. 127, 131.

(Court of Appeal 1958):

The safety of the port should be viewed in respect of a vessel properly manned and equipped, and navigated and handled without negligence and in accordance with good seamanship. This may include, where circumstances so require, and if available, the engagement of a pilot or the use of a tug or tugs or, especially if such assistance is not available, consultation with a harbour-master or some other responsible person with knowledge and experience of the port.

Further, it may not legitimately be denied that a vessel is entitled to rely upon a terminal-owner's performance of its obligation to exercise reasonable care to provide a safe berth by ascertaining, and warning, or removing, of any hazards in the approach, as mandated by the U.S. Supreme Court in *Smith v. Burnett*, 173 U.S. 430 (1899).

- CARCO asserts that Frescati contends the court should ignore the specific facts and circumstances of the case. Issues Br. at 15. It is plainly wrong to say Frescati contends the court should ignore the facts. It was Frescati who called for a remand. The facts established by the evidence are that the ship's draft was 36' 7", she did not approach at an inappropriate time or tide, and squat had nothing to do with the casualty.
- CARCO asserts that Frescati contends only the ship's static, or stationary, draft is relevant, and not any change in UKC due to a ship's movement through the water. Issues Br. at 15-17. What Frescati contends is that the 37' draft in the Voyage Instructions was to be ascertained on completion of loading, when the ship was stationary in the loading berth. It would be absurd to contend the Voyage Instructions refer to a variable draft. It would be equally absurd to contend that Frescati would say it could ignore any change in under-keel clearance due to squat. It is worth noting again that squat does not change a ship's draft; rather it actually lowers the water level around her. However, in this case

there was little or no squat because the ship was moving very slowly as she was pushed sideways by tugs. CARCO's expert witnesses admitted as much. That is why the accepted safety margin for UKC of slowly maneuvering vessels is only 5% of draft, instead of the 10% preferred for ships under way.

- CARCO asserts that Frescati contends the Third Circuit's reference to berthing at an inappropriate time is limited to "timing alone." Issues Br. at 17. Obviously, timing means the stage of tide, and the stage of tide, along with draft and squat, determines under-keel clearance. It makes no sense to claim that Frescati disputes the relevance of either draft, squat, or stage of tide. The factual evidence overwhelmingly shows draft, squat and stage of tide were all proper for ATHOS I's approach and did not cause the accident.
- CARCO asserts that Frescati contends CARCO's duty was to make "certain that the approaches were safe at all stages of tide," quoting footnote 9 to Frescati's Preliminary List of Issues on Remand, but then asserts that it made no such *warranty*. Issues Br. at 20, 28. Frescati's note 9 was footnoted to its discussion about wharfinger negligence, not warranty. "All stages of tide" means the stages at which CARCO knew the Docking Pilots would dock ships on their respective drafts. In this case, the relevant aspect of CARCO's duty was to exercise due care to make certain the approach was safe for a ship with a draft up to 37' 6" approaching at the beginning of flood current, as provided in the Docking Pilots Association's guidelines agreed with CARCO five years earlier. *In re Frescati Shipping Co.*, 718 F.3d at 195 n.7.
- CARCO asserts that Frescati contends it was impossible to avoid the anchor. Issues Br. at 10. What Frescati contends is that the unforeseeable anchor could not be avoided by the exercise of *ordinarily* prudent seamanship, such as crossing the anchorage on a draft up

to 37' 6" at the start of flood current. Otherwise, the unknown anchor could only have been avoided by going far beyond the dictates of good seamanship, and arbitrarily delaying berthing until high tide without good cause, charging CARCO demurrage at \$42,000/day for the waiting time. "But if more than ordinary skill is required to avoid the dangers the port will not be safe." T. Coghlin, *et al*, *Time Charters* § 10.46, at 208 (7th ed. 2014).

As written by Thomas Aquinas: "If the highest aim of a captain were to preserve his ship, he would keep it in port forever." Short of that, a ship must perform voyages, exercise ordinary (not extraordinary) care, and assume the incumbent risks, which do not include an 8' long anchor in front of an oil terminal, as CARCO's expert witnesses admit.

CARCO's Issues Brief devoted more than 30 pages to legal points that have never been in dispute. These boil down to the principles that wharfingers and warrantors of safe ports are not liable for damage that is caused *solely* by unseaworthiness or the negligence of the ship's crew or pilots, and that damages can be apportioned in cases of shared fault. Issues Br. at 5-14, 37-50, 101-05, 127-31. Another of CARCO's superfluous legal points is that a safe port warranty is not breached by temporary tidal conditions. Issues Br. at 21-26. This case is not about temporary tidal conditions. It is about an obstruction that injured the ship while proceeding in the appropriate tidal conditions for her draft, as determined by the Docking Pilots Association guidelines it agreed with CARCO, *In re Frescati Shipping Co.*, 718 F.3d at 195 n.7, and the acceptable margin of under-keel clearance for a slowly maneuvering vessel. Both sides' tide experts, and both the River Pilot and the Docking Pilot who guided ATHOS I up the river and across the anchorage, said that tidal conditions were normal.

Additionally, CARCO reargues several points that were rejected by the Third Circuit.

- CARCO reargues that Paulsboro's safety is supposedly evidenced by the alleged fact that hundreds of ships passed safely through the anchorage, and ATHOS I therefore must have been negligent. Issues Br. at 6-7, 9, 12, 31. This point was foreclosed by the Third Circuit: "That similar ships had successfully berthed at the port is irrelevant to whether the warranty was breached in this case." *In re Frescati Shipping Co.*, 718 F.3d at 204. CARCO acknowledges the Third Circuit held previous traffic is not relevant to whether the warranty was breached, but argues it is relevant to whether it was possible to avoid the danger by good seamanship. Issues Br. at 6-7. This argument is internally inconsistent, because, as CARCO recognizes, the very definition of an unsafe port is that a hazard cannot be avoided by good seamanship. *Id.* If previous ships are not relevant to whether the port is unsafe, then, by definition, they are not relevant to whether a hazard could have been avoided by good seamanship.
- CARCO reargues that the Government controls the anchorage, and has -- or has assumed--the responsibility to survey for submerged obstacles. Issues Br. at 141-43. Yet, it contradicts itself when it acknowledges the Government does not survey for submerged obstacles absent notice of a potential hazard. *Id.* at 170. This point was foreclosed by the Third Circuit: "No Government entity, however, is responsible for preemptively searching all federal waters for obstructions, and the District Court found that the Government does not actually survey the Anchorage for hazards." *In re Frescati Shipping Co.*, 718 F.3d at 194.
- CARCO reargues that terminals have no duty in an approach that passes through a federal anchorage. Issues Br. at 144-45, 158-59. This point was foreclosed by the Third Circuit: "A wharfinger . . . is bound to use reasonable diligence in ascertaining whether the

berths themselves and the approaches to them are in an ordinary condition of safety.” *In re Frescati Shipping Co.*, 718 F.3d at 207 (quoting *Smith*, 173 U.S. at 436). The court held CARCO’s approach ran through the anchorage from the up-river channel to the berth, and remanded for a determination of what conduct would satisfy its duty in that approach. If CARCO had no duty merely because its approach passed through a federal anchorage, the court would not have remanded the issue of standard of care.

- CARCO reargues that the anchor-dropper was solely at fault for the presence of the anchor. Issues Br. at 131. This point was foreclosed by the Third Circuit: “CARCO further argues that proximate cause is lacking on the basis that the anchor-dropper was the actual cause of the accident. It is clear, however, ‘that there may be more than one proximate cause of an injury.’” *In re Frescati Shipping Co.*, 718 F.3d at 212 (citations omitted). CARCO would have to bear the risk of an inability to recover contribution from its joint tortfeasor. *Coats v. Penrod Drilling Corp.*, 61 F.3d 1113, 1124-30 (5th Cir. 1995).
- CARCO even reargues the applicability of the decisions relied upon by the Third Circuit for its holding that a berth-owner owes a duty to its invited ships to exercise reasonable diligence to provide a safe approach, namely *Smith v. Burnett, The Calliope*, [1891] A.C. 11 (House of Lords 1890), and *The Moorcock*, 13 P.D. 157 (1888 L.R.) (Probate, Divorce and Admiralty Division 1888), *aff’d*. 14 P.D. 64 (1889 L.R.) (Court of Appeal 1889). *In re Frescati Shipping Co.*, 718 F.3d at 207, 210-11 & nn. 27, 28, 30. Issues Br. at 159-60. The Third Circuit’s holding is the law of *this* case!

If any of these reargued contentions were material or correct, the Third Circuit would not have remanded for the very specific findings of fact it itemized. CARCO's many superfluous contentions should not distract this court from the issues defined by the Third Circuit.

#### IV. ARGUMENT

##### A. **ATHOS I's draft was 36' 7" at the time of the casualty, and less than the 37' posited by the Third Circuit and the 37' 6" deemed safe at Paulsboro at the start of flood current.**

##### 1. **The ship's draft was 36' 7" at the time of the incident.**

A ship's draft can be visually observed when she is in a berth, as upon completion of loading at Puerto Miranda, by reading the draft marks on her hull. When a ship is under way at sea or in a bay or a river, as in the Delaware Bay or River, the draft marks cannot easily be observed because they can be obscured by waves, as explained by the River Pilot and Frescati's expert witness on pilotage. (*Trial Tr. Day 2, September 22, 2010, Teal, at 67:20-68:7<sup>3</sup>; Trial Tr. Day 34, December 2, 2010, Betz, at 73:3-23<sup>4</sup>*). At such times, the draft must be calculated by the vessel's computer, which is programmed for the particular vessel's characteristics. This is routine shipping practice. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 4:3-5:19<sup>5</sup>*).

Draft calculations are based on the weight and characteristics of the vessel herself and the weights and distribution of cargo, fuel oil, fresh water, ballast water, stores, crew, and other weights factored into the program, and whether the ship is in fresh water or salt water. The accuracy of the calculations can be tested and confirmed by comparing the calculated draft with the visually observed draft at another point in time, adjusting for changes in weights, such as the addition or consumption of fuel oil, or the taking on or discharge of ballast water, and adjusting for salinity if the comparison involves salt water and fresh water ports. Puerto Miranda and Paulsboro are fresh water ports, so a comparison at each port is "apples to apples," requiring no



adjustment for salinity. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 41:20-42:6<sup>6</sup>; Trial Tr. Day 2, September 22, 2010, Teal, at 71:22-24<sup>7</sup>*). Frescati's naval architect expert witness, Tony Bowman, calculated and confirmed the ship's draft at Paulsboro by this method, and CARCO's naval architect, George Petrie, agreed with his result!

Additionally, Bowman calculated and confirmed the ship's draft at Paulsboro based on information and observations available after the casualty.

CARCO cannot challenge the visually observed draft at Puerto Miranda, or the cargo's weight and the absence of ballast water there, because these were reported by CARCO's own independent surveyor, BSI Inspectorate, the cargo supplier, PDVSA, and the ship. (*Exs. P-399 (Stowage Plan), P-412 (Tsakos Ullage Report), P-413 (BSI Inspectorate Ullage Report), P-1320 (PDVSA Ullage Report)*). The draft is stated in meters in these reports; 11.12 meters equals 36' 6". (The Master decided to load to 36' 6" instead of the 37' in CARCO's Voyage Instructions because his experience told him the Maracaibo Channel was not safe on 37'). (*Trial Tr. Day 13, October 13, 2010, Markoutsis, at 200:7-201:13<sup>8</sup>; Trial Tr. Day 4, September 27, 2010, Zotos, at 22:21-23:15<sup>9</sup>*).

CARCO would like to question the reliability of the weights recorded in the ship's logs, which are the bases of the subsequent draft calculations, merely because they were recorded by the crew. However, it points to no reason to doubt the logs. There was no reason for the crew to falsify entries; they did not know they would strike an anchor at the end of the voyage that would make the draft an issue. There is no suggestion the recorded weights were abnormal.

As noted, Frescati's expert, Bowman, used several methods to calculate, confirm, and reconfirm that ATHOS I's draft was 36' 7" at the time of the casualty. First, he calculated the draft upon departure from Puerto Miranda, and found it was 36' 6" on fresh water, with an even

keel, just as reported by the vessel and all the inspectors there. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 135:10-136:3<sup>10</sup>, 136:21-137:8<sup>11</sup>, 138:5-139:7<sup>12</sup>, 140:2-7<sup>13</sup>; Trial Tr. Day 12, October 12, 2010, Bowman, at 3:21-4:10<sup>14</sup>, 5:20-6:20<sup>15</sup>; Trial Tr. Day 4, September 27, 2010, Zotos, at 40:11-41:6<sup>16</sup>; 42:7-43:23<sup>17</sup>; Exs. P-399 (Stowage Plan), P-412 (Tsakos Ullage Report), P-413 (BSI Inspectorate Ullage Report), P-1320 (PDVSA Ullage Report; P-948 at p. 4 (Bowman Loading Condition Report))*). CARCO's expert, George Petrie, agreed. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 12:22-13:3<sup>18</sup>, 60:7-14<sup>19</sup>, 65:6-22<sup>20</sup>; Ex. P-1544 (Petrie Loaded Condition Report)*)).

The ship's fresh water mean draft on arrival at Delaware Bay the morning of November 26, 2004 was calculated to be 36' 4". She was trimmed by the bow (the bow was deeper than the stern) by reason of the consumption of fuel oil from the fuel tanks that were located "aft," *i.e.*, towards the stern of the ship. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 55:10-56:10<sup>21</sup>; Trial Tr. Day 26, November 15, 2010, Petrie, at 13:4-22<sup>22</sup>*).

Because CARCO's Voyage Instructions were to arrive at Paulsboro on an even keel (to make it easier to measure the liquid cargo on board), the ship took 283 tons of water ballast in no. 7 port ballast tank and 227 tons in no. 7 starboard ballast tank to level the trim and correct a slight list. The required volumes and locations of ballast were determined by the ship's computer program. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 54:14-57:8<sup>23</sup>, 57:19-58:18<sup>24</sup>; Trial Tr. Day 11, October 7, 2010, Bowman, at 141:4-8<sup>25</sup>; Exs. P-360 (Voyage Instructions)*). Adjusting for the consumption of fuel oil and consumable stores on the voyage from Venezuela, and the addition of 510 tons of ballast water, Bowman calculated the ship's arrival draft at Paulsboro, with that ballast, was 36' 7" on the basis of fresh water and on an even keel. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 3:12-20<sup>26</sup>, 6:6-20<sup>27</sup>*). **Petrie agreed!** (*Trial Tr. Day 26,*

*November 15, 2010, Petrie, at 68:18-69:4;<sup>28</sup>, 69:19-23<sup>29</sup>; Ex. P1545, at p. 16.*) (The ship's officers calculated the draft at 36' 6".) (*Trial Tr. Day 14, October 14, 2010, Markoutsis at 14:20-15:2<sup>30</sup>; Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18<sup>31</sup>; Trial Tr. Day 8, October 4, 2010, Bethel, at 24:23-25:1<sup>32</sup>*). A difference of 1" is within the acceptable tolerance in the calculation of drafts. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 137:25-138:4<sup>33</sup>; Trial Tr. Day 12, October 12, 2010, Bowman, at 5:5-7<sup>34</sup>.*)

Bowman also confirmed the 36' 7" draft by working back from the observed drafts on November 29, 2004, after the ship was brought back to the upright and the trim was corrected. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 6:21-25<sup>35</sup>, 8:7-10:5<sup>36</sup>, 10:17-18:5<sup>37</sup>; Ex. P-1333 (K. Edgar Certification)*).

Finally, Bowman used photographs of the ship's drafts taken the morning of November 27, 2004, the day after the casualty, and the recorded draft observed later that day by a Caleb Brett cargo surveyor, Oscar Castillo, as reported to a marine surveyor on board, David Hall. Castillo's own notebook was never located. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 10:17-18:5<sup>38</sup>; Ex. P-494 (EMS Photographs, 11/27/04); Trial Tr. Day 11, October 7, 2010, Castillo, at 35:4-18<sup>39</sup>, 36:9-14<sup>40</sup>; Trial Tr. Day 10, October 6, 2010, Hall, at 178:10-179:6<sup>41</sup>, 179:23-180:1<sup>42</sup>; Ex. P-495 (Hall's notes)*).

To compare Castillo's observed drafts with any calculated drafts, it was necessary to correct the observed drafts for the bow trim and port list, and obtain a midship centerline draft. After correcting the draft, Bowman and Petrie both found close agreement between Castillo's observed draft and the calculated draft for November 27. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 10:17-16:8<sup>43</sup>; Trial Tr. Day 26, November 15, 2010, Petrie, at 78:11-19<sup>44</sup>, , 85:9-12<sup>45</sup>; Ex. P-949a (Diagram--Section in Way of Aft Draft Marks)*).

Although Petrie agreed with Bowman's calculations of the 36' 7" draft based on the ship's figures and Castillo's drafts, he also had an alternate theory. He said the draft could have been as much as 36' 9" to 36' 10" at the time of the incident, because the ship might have had more ballast than the crew observed and recorded. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 27:3-18<sup>46</sup>, 98:16-20<sup>47</sup>*). *That would still be less than the 37' posited by the Third Circuit as a qualification on the safe port warranty.* Nevertheless, Petrie's alternate theory was wrong.

Petrie's alternate theory was at first based on an erroneous comparison between Castillo's observed drafts on November 27th and Petrie's own calculated draft for that date, from which he concluded there was 420-525 tons more ballast on board than the 510 tons recorded by the crew. *However, Petrie was in error, because Castillo's observed drafts were not corrected for trim and list. (Trial Tr. Day 26, November 15, 2010, Petrie, at 78:11-79:11<sup>48</sup>). When corrected, which Petrie agrees must be done, Castillo's drafts closely agree with Petrie's calculated draft, and the supposed presence of extra ballast water falls away. (Trial Tr. Day 26, November 15, 2010, Petrie, at 75:4-76:10<sup>49</sup>, 78:11-19<sup>50</sup>).*

Petrie even drew up a plan of where the occult ballast water was located, but didn't account for how it miraculously distributed itself in the ship's 14 wing ballast tanks so it did not affect the ship's list or trim while it allegedly leaked on board. His theory included 250 tons of water in the no. 6 port ballast tank. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 20:3-16<sup>51</sup>*). He didn't know that an independent surveyor, David Hall, had actually climbed down into that tank with a Lloyd's Register surveyor and a representative from the Qualified Individual, to make sure the damage to the adjacent no. 7 port tank did not extend to the no. 6 port tank. No. 6 port tank was empty and showed no signs there had been any water there recently. (*Trial Tr. Day 10, October 6, 2010, Hall, at 173:23-25<sup>52</sup>, 174:12-175:6<sup>53</sup>, 177:6-18<sup>54</sup>, 212:3-213:5<sup>55</sup>*).

When Petrie learned of this, all he could say was the occult ballast water could have been anywhere. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 20:17-21:5*<sup>56</sup>, *55:2-58:1*<sup>57</sup>, *80:11-25, 81:19-82:10, 82:21-83:5*<sup>58</sup>).

The second basis of Petrie's alternate theory was announced for the first time while he was on the witness stand. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 54:15-55:11*<sup>59</sup>). This involved an analysis of the weights needed to bring the ship back to the upright after the casualty. The ship had been down by the bow and had a port list, and was brought to an upright and even keel condition on November 28 by adding ballast water to starboard tanks, and transferring ballast water, fuel oil, and fresh water from port tanks to starboard tanks. (*Trial Tr. Day 9, October 9, 2010, Umbdenstock, at 34:24-35:13*<sup>60</sup>, *35:23-36:3*<sup>61</sup>, *76:4-78:10*<sup>62</sup>; *Ex. P-482 at ATHOS 01730 (Cargo Control Room Log)*). Petrie thought the weights of the transfers were not sufficient to bring the ship upright, and postulated another 400 to 600 tons of ballast water must have been on board, beyond the 510 tons recorded by the crew. (*Ex. P-1554 (Petrie Calculation--Assessment of Heel Caused By Liquid Movement on November 28, 2004 (TMC Data)*; *Trial Tr. Day 26, November 15, 2010, Petrie, at 30:19-31:6*<sup>63</sup>, *97:22-98:9*<sup>64</sup>). He opined that with this extra ballast, the ship's draft would have been 36' 9" to 36' 10" at the time of the incident. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 27:3-18*<sup>65</sup>, *98:16-20*<sup>66</sup>).

Petrie's calculation was erroneous because it failed to account for the *damaged* condition of the no. 7 port ballast tank and used an equation appropriate for *intact* tanks. His calculation failed to take into account the fact that the no. 7 port ballast tank was open to the river so that ballast water would have flowed *out* of the hole in no. 7 port ballast tank as the list was corrected, as the water level inside the tank equalized with the level outside. Therefore, bringing

the ship upright did not require the additional weight Petrie postulated. (*Trial Tr. Day 33, December 1, 2010, Bowman, 71:7-76:10<sup>67</sup>*).

**2. The tugs did not cause the ship to heel (i.e. lean over).**

CARCO claims its expert witness, Petrie, testified the tugs pushing on the starboard side “necessarily caused the vessel to heel to the port side,” increasing the draft on that side. Issues Br. at 37. To the contrary, Petrie said he did *not* form an opinion whether there was in fact any such heel. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 104:2-11*):

“Q. Am I also correct in saying that you haven’t formed an opinion, in this case, with a reasonable degree of certainty, as whether the tugs that were breasting the Athos I to the Citgo berth, actually caused the ship to heel to the port side.

A. I have not formed an opinion in this particular case as to what that heel may have been.

Q. You haven’t calculated whether there was any heel, have you?

A. I believe that’s what I just said.”

CARCO is wrong if it means to intimate that the Master and Chief Officer testified the tugs pushed the vessel into a list. Issues Br. at 37, 84. CARCO’s security video shows there was no list as the ship crossed the anchorage until after she hit the anchor. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-17:16<sup>68</sup>, 18:7-12<sup>69</sup>, 19:20-23<sup>70</sup>; Trial Tr. Day 14, October 14, 2010, Markoutsis, 34:2-35:11<sup>71</sup>; Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7<sup>72</sup>*).

The Master merely acknowledged the tugs were pushing when the list was noticed. (*Trial Tr. Day 15, October 18, 2010, Markoutsis, at 33:3-11<sup>73</sup>*). Obviously they were pushing; that was how the ship crossed the anchorage.

When the Chief Officer saw the list, he went immediately to the control room and checked the gauges for the cargo tanks and ballast tanks. He found no. 7 center cargo tank was losing cargo, and water (and/or cargo) was entering no. 7 port ballast tank. (*Trial Tr. Day 4,*

*September 27, 2010, Zotos, at 68:10-70:7<sup>74</sup>, 78:20-79:4<sup>75</sup>*). Faced with a serious problem of unknown dimensions, the crew sounded all the tanks every half hour until midnight, when the Master was satisfied there was no additional ingress of river water. The crew confirmed that all the ballast tanks had remained empty, except no. 7 port and starboard. (*Id.* at 75:2-77:2<sup>76</sup>, ; 77:15-18<sup>77</sup>, 78: 20-79:4<sup>78</sup>, 81:16-25<sup>79</sup>, 83:4 to 84:9<sup>80</sup>; *Exh. P-481 (Discharge Rate Progress Log)*). The chief officer reacted quickly by transferring cargo out of the ruptured no. 7 center tank into no. 4 center to stop the spillage of oil. (*Trial Tr. Day 14, October 14, 2010, Markoutsis, at 44:6-45:22<sup>81</sup>; Trial Tr. Day 4, September 27, 2010, Zotos, at 72:6-74:3<sup>82</sup>*).

When Docking Pilot Bethel saw a list, it occurred to him the tugs might have pushed the ship over, but that would be “odd,” or “a stretch,” on a tanker because the tugs were doing nothing that they didn’t usually do. He ordered the tugs to ease off, *but the list only increased!* Therefore, he immediately went outside to the wing bridge and saw the spilled oil in the water. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 17:20-18:4<sup>83</sup>, 88:10-24<sup>84</sup>*).

It asks too much to believe the speculation that the 64,000 deadweight ton vessel, having travelled upright 1,100 feet through the anchorage, was suddenly pushed over by the tugs at the precise moment she was above the anchor, when, simultaneously, no. 7 port ballast tank filled with water, and oil gushed to the surface from the adjacent no. 7 center cargo tank.

Even if CARCO’s theory were true, it would not be relevant. If the tugs pushed the ship over 1/2° as CARCO alleges, that would have increased the draft on one side by 5 1/2”. (A 1° list increases draft on one side by 11”. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 78:5-79:3<sup>85</sup>*). The increased draft would still allow an acceptable safety margin for under-keel clearance. Even at the *shallowest* spot in the area where the anchor was, which on CARCO’s

theory was 41.26' (41' 3")<sup>8</sup>, a momentary dynamic port-side draft of 37' 0.5" (*i.e.* 36' 7" + 5.5") would have left the ship with under-keel clearance of more than 4', or more than 10% of her draft. That would satisfy the 10% safety margin argued by CARCO, and be twice the 5% margin opined by Frescati's experts.

### 3. **The ship never touched the river bottom.**

In another mistaken attempt to prove the ship's draft was excessive, CARCO asserts that her echo sounder showed "zero" clearance on some occasions, and suggests this means the ship contacted the river bed, citing its expert witness on pilotage, James Haley. Issues Br. at 85-86.

What Haley actually said was:

Q. Captain, you haven't seen any evidence that indicates that there were any problems with the ship coming up the river until the point that it came in contact with that anchor, in terms of under-keel clearance or touching the bottom or going aground, did you?

A. I would say I've not seen any, any documentation that there were any problems. \* \* \*

*(Trial Tr. Day 24, November 9, 2010, Haley, at 173:11-17).*

Q. Now, did you say that you saw evidence that, from the echo sounder, that the ship touched bottom?

A. No, that's not what I said.

Q. Okay, what did you mean?

A. I said that there were places on the recording that seemed to indicate zero under-keel clearance or no reading.

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<sup>8</sup> Traykovski said the shallowest depth was approximately 41' at MLLW, and Cole said the rise in tide was 0.26' above MLLW. *(Trial Tr. Day 22, November 4, 2010, Traykovski, at 50:10-16; Trial Tr. Day 21, November 3, 2010, Cole at 83:15-84:23. See endnote 271).* Frescati contends the anchor was at an even shallower depth.



Q. In your experience, is there an explanation for a reading like that, other than the vessel touching bottom or close to touching bottom?

A. Well, as I said, in my opinion, is that echo sounders are prone to all kinds of errors and it's possible that a zero reading could be an error or a malfunction.

Q. Do you know whether a zero reading can be the result of cavitation from the propeller of a passing ship or tug?

A. It's possible that turbulence of some sort could interfere with it momentarily.

*(Trial Tr. Day 24, November 9, 2010, Haley, at 179:13-180:3).*

CARCO contradicts its own contention that the echo sounder shows inadequate under-keel clearance when it states the echo sounder's location toward the ship's stern subjected it to turbulence and bubbles, rendering any "zero" readings meaningless. Issues Br. at 86.

Haley also acknowledged that he saw no records or testimony that reported any of the phenomena he would expect when a ship's keel gets close to the river bottom, such as heavy vibration, sluggish steering, and a change in rpm. *(Trial Tr. Day 24, November 9, 2010, Haley, at 180:19-181:23<sup>86</sup>)*. The Master and River Pilot confirmed there were no such phenomena, and the ship's echo sounder confirmed there was ample under-keel clearance. *(Trial Tr. Day 14, October 14, 2010, Markoutsis, at 26:10-18<sup>87</sup>, 27:2-15<sup>88</sup>; Trial Tr. Day 2, September 22, 2010, Teal, at 28:10-30:1<sup>89</sup>; Trial Tr. Day 2, September 22, 2010, Esplana, at 1163:17-167:18<sup>90</sup>)*.

In Haley's response to the first question quoted above, he went on to say: "But given the lack of under-keel clearance, in this case, I would not have confidence that she might not have touched the bottom or slid through some mud along the way." *(Trial Tr. Day 24, November 9, 2010, Haley, at 173:11-20<sup>91</sup>)*. However, he further testified, *(at 173:21-23)*:

"Q. But you have no evidence that that actually occurred, do you?

A. I don't seen any evidence of that, no."

Haley's supposition about a lack of under-keel clearance was not based on the echo sounder or any other evidence, as he said he did not see any evidence of any problem with under-keel clearance. Rather, his supposition came from a calculation of hypothetical under-keel clearance, including unrealistic theoretical squat, on the up-river voyage at transit speed, and an alleged 38' spot in the anchorage. There was no actual 38' spot. The shallowest soundings in an Army Corps of Engineers multi-beam sonar survey on November 28, 2004 were 38.8' and 38.9' at MLLW, within a small area. (*Trial Tr. Day 6, September 29, 2010, Capone, at 163:11-165:8*<sup>92</sup>). Judge Fullam rightly considered it strange that Haley calculated a *negative* under-keel clearance in the channel, when the ship did not go aground. (*Trial Tr. Day 24, November 9, 2010, Haley, at 164:21-165:9*<sup>93</sup>).

There are several formulae for calculating theoretical squat, which are all imperfect and dependent on numerous and changing parameters as a ship sails up a river, such as the ship's speed, the depth of water, and the configuration of the river. The formulae frequently do not predict the same result as each other, and are undergoing changes, as acknowledged by CARCO's expert, Larry Daggett. (*Trial Tr. Day 27, November 16, 2010, Daggett, at 210:23-211:4*<sup>94</sup>; *Trial Tr. Day 28, November 17, 2010, Daggett, at 20:11-24*<sup>95</sup>; *Trial Tr. Day 34, December 2, 2010, Betz, at 149:16-150:12*<sup>96</sup>). Daggett selected the Barrass formula for his analysis of ATHOS I, which is known to overstate squat. (*Trial Tr. Day 27, November 16, 2010, Daggett, at 227:17-20*<sup>97</sup>). "In some cases where this formula has been compared to measured squat, the margin of safety was found to be too large for practical operations." (*Ex. P-1512 at 88 (Shiphhandling for the Mariner, 4th Ed.)*).

Additionally, there are two versions of the Barrass formula, as for all the squat formulae; one for open water and one for confined water. The latter *doubles* hypothetical squat. (*Trial Tr.*

*Day 27, November 16, 2010, Daggett, at 212:22-213:14<sup>98</sup>*). Daggett used the one for confined water, doubling hypothetical squat, notwithstanding that he *knew* the formula for confined water is not appropriate in the Delaware River, and previously said so in another study. (*Id. at 215:15-216:12<sup>99</sup>; Ex. P-1516, at 22*).

No wonder Daggett calculated *negative* UKC, which, if it had really happened, would have had the ship plowing through the river bed. (*Trial Tr. Day 27, November 16, 2010, Daggett, at 167:18-21<sup>100</sup>; Trial Tr. Day 28, November 17, 2010, Daggett, at 17:8-14<sup>101</sup>*).

Daggett claimed he used the formula for confined water because Second Officer Caro used it when he prepared a voyage plan. (*Trial Tr. Day 27, November 16, 2010, Daggett, at 213:15-17<sup>102</sup>*). Caro's use of that formula did not cause the accident. Daggett, however, is supposed to be a disinterested expert, whose job is to help the court understand the evidence or determine a fact in issue, not leave a false impression that the ship actually had insufficient under-keel clearance. F.R.E. Rule 702.

Further, the areas of alleged insufficient under-keel clearance theorized by CARCO's experts were all in the outside lateral quadrants of the 800' to 1,600' wide channel (ATHOS I's beam was under 106'), where the ship would not go, absent some dire circumstance. River Pilot Teal took the ship through the deep water in the center quadrants all the way up the river, and the crew monitored the ship's echo sounder. (*Trial Tr. Day 2, September 22, 2010, Teal, at 39:24-41:6<sup>103</sup>; Trial Tr. Day 14, October 14, 2010, Markoutsis at 20:18-22:24<sup>104</sup>, 27:2-15<sup>105</sup>; Trial Tr. Day 15 October 15, 2010, Markoutsis at 39:20-40:8<sup>106</sup>; Trial Tr. Day 34, December 2, 2010, Betz at 91:12-94:22<sup>107</sup>, 96:20-99:2<sup>108</sup>; Trial Day 12, October 12, 2010, Bowman at 38:19-40:4<sup>109</sup>; Trial Tr. Day 2, September 22, 2010, Esplana, at 163:17-167:18<sup>110</sup>; Trial Tr. Day 34,*

*December 2, 2010, Betz, at 92:3-15<sup>111</sup>, 96:12-99:2<sup>112</sup>; Trial Tr. Day 2, September 22, 2010, Wister, at 114:14-115:10<sup>113</sup>).*

Ultimately, CARCO's expert had to admit the knowledge of a local Pilot is irreplaceable. *(Trial Tr. Day 27, November 16, 2010, Daggett, at 229:5-17<sup>114</sup>).*

While Frescati strenuously disagrees with CARCO's contentions about UKC on the river trip, the subject is irrelevant to the anchorage and the allision. If the ship would arrive off Paulsboro at too low a depth of water to cross the anchorage, or if the current was running in the wrong direction, she could have bided her time by slowing down, or continuing up-river and then turning around, or waiting in place, until the tide rose or the current changed. But the depth was not too low, the flood current was running, and there was no reason to wait.

Haley also based his supposition about insufficient UKC on what he "understood" the Docking Pilot had testified about a controlling depth in the anchorage of 37'. *(Trial Tr. Day 24, November 9, 2010, Haley, at 169:16-170:2<sup>115</sup>).* Haley was mistaken about that, however, because Docking Pilot Bethel's only reference to a 37' depth was a sounding in the *north* end of the 2.2 mile long anchorage, nowhere near where ATHOS I crossed to go to CARCO's terminal. *(Trial Tr. Day 8, October 4, 2010, Bethel, at 81:2-82:9<sup>116</sup>, 95:4-12<sup>117</sup>; Trial Tr. Day 10, October 6, 2010, DePasquale, at 102:14-103:2<sup>118</sup>).* Little wonder that CARCO cites *Haley*, not *Bethel*, for its assertion that "the pilot considered that a controlling depth of only 37 feet of water was available. . . ." Issues Br. at 84.

Unlike Haley, another CARCO witness, Mitchell Stoller, opined only at trial and not in his report that the echo sounder did show the vessel touched bottom on an alleged 38' spot at 20:49 or 20:50 hours, just after entering the anchorage at 20:48. *(Trial Tr. Day 31, November 23, 2010, Stoller, at 89:13-17<sup>119</sup>, 111:14-18<sup>120</sup>).* However, while Stoller knew ATHOS I's engine

was backing (running in reverse) at that time, *id.* at 88:3-16<sup>121</sup>, 89:13-25<sup>122</sup>; *Ex. P-372 (Engine Bell Book)*, he nevertheless failed to consider that this would have caused turbulence that obscured the echo sounder read-out. (*Trial Tr. Day 33, December 1, 2010, Bowman, at 61:22-65:8*<sup>123</sup>; *Trial Tr. Day 34, December 2, 2010, Betz at 80:18-83:12*<sup>124</sup>; *Trial Tr. Day 6, September 29, 2010, Capone, at 161:24-163:4*<sup>125</sup>; *Trial Tr. Day 18, October 21, 2010, Bolton, at 96:17-97:11*<sup>126</sup>). However, the read-out was not entirely obliterated and in fact shows a depth of 2 meters or 6' 6" of water under the keel immediately before and after the turbulence. (*Trial Tr. Day 33, December 1, 2010, Bowman, at 63:11-25*<sup>127</sup>; *Ex. P-464A*). Therefore, the echo sounder, if not the entire ship, did not go over the alleged 38' spot.

Further, for the ship to have contacted a 38' spot, and have an inferred draft of at least 38', she would have had to leak in some 2,500 tons of river water. An increase in draft from 36' 7" to 38' would be 1' 5". ATHOS I's draft would increase 1" per approximately 150 tons of water. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 140:17-141:3*<sup>128</sup>). An increase of 1' 5" would have required 2,550 tons of water to have gotten in through the supposedly faulty ballast system, without the crew's knowledge and without affecting the ship's list or trim, and without the Coast Guard and other investigators being aware of a surreptitious attempt to pump off that water. Each element of that theory would be impossible.

#### **4. There was no extra ballast water on board to change the draft.**

Other than the tugs supposedly pushing the ship into a list, CARCO's only "hook" to question ATHOS I's draft of 36' 7" is the assertion that there was more ballast water on board than the crew recorded. Despite Petrie's agreement that the *evidence* shows the draft was less than 37' feet at the time of the incident, CARCO *speculates* there was more "extra ballast" at the time of the incident than even Petrie hypothesized, which somehow got on board without the

crew's knowledge, and was discovered after the casualty and then secretly pumped out, hidden from the Coast Guard and other inspectors on board. Issues Br. at 35-36.

However, it was impossible for ballast water to get onto the ship without manually opening the sea valve and two manual pump by-pass valves in the pumproom, or to flow into the ballast tanks without running the hydraulic pump to open the ballast system valves. Finally, the ballast tanks other than no. 7 port and starboard were empty after ballasting on November 26, and remained empty after the casualty. There were no signs that any ballast water had been pumped out.

ATHOS I's ballast tanks were empty when she departed Puerto Miranda, and were regularly sounded and found empty during the sea voyage. (*Trial Tr. Day 4, September 27, 2010, Zotos at 29:4-38:17*<sup>129</sup>, *50:17-23*,<sup>130</sup>; *Exs. P-399 (Stowage Plan); P-474 (Monitoring of Cargo Tanks, Water Ballast Tanks, and Void Spaces)*).

On November 26, 2004, the ship took on 510 tons of ballast water in the no. 7 port and starboard ballast tanks in the Delaware Bay to level the fore-aft trim and correct a slight list that had resulted from the consumption of fuel oil from the aft fuel tanks on the voyage from Venezuela. This took only about 15 minutes. (*Trial Tr. Day 5, September 28, 2010, Zotos at 33:23-34:1*<sup>131</sup>).

CARCO wrongly states the Chief Officer admitted the other ballast tanks were not sounded after ballasting 7 port and starboard tanks to see if any water had gotten into them. Issues Br. at 113-14. Chief Officer Zotos testified to precisely the opposite: "After completion of ballasting of these tanks all remaining ballast tanks were sounded." (*Trial Tr. Day 5, September 28, 2010, Zotos, at 36:13-17*). Asked a second time by CARCO's counsel, he repeated: "As I said before, after this ballasting all the ballast tanks were sounded." (*Id. at 37:5-10*). Zotos was

present at the sounding of no. 7 port and starboard by a crew member, who then went on to sound the remaining ballast tanks without Zotos. (*Id.* at 37:15-38:8<sup>132</sup>). Contrary to CARCO's assertion, Issues Br. at 114, the absence of measurements in the logs for any ballast tank does not indicate that it was not sounded, but rather that it was found empty when it was sounded. (*Id.* at 38:9-15<sup>133</sup>).

Pumpman Figueros testified it was normal practice to sound all the ballast tanks after taking on ballast. (*Figueros Dep. Designation, August 1, 2007, at 66:5-10*<sup>134</sup>). Nothing suggests the normal practice was not followed.

CARCO argues that the Master failed to tell River Pilot Teal that the ship took on ballast, which Teal would want to know because ballasting affects draft. Issues Br. at 93. However, the ballast was taken in the Delaware Bay before the pilot boarded, and it only took 15 minutes. (*Trial Tr. Day 15, October 18, 2010, Markoutsis at 67:4-9*<sup>135</sup>; *Trial Tr. Day 4, September 27, 2010, Zotos, at 54:21-22*<sup>136</sup>, *63:17-20*<sup>137</sup>), and the Master gave Teal the ship's draft of 36' 6" on a fresh water basis, as it would be at Paulsboro, taking into account the ballast taken. (*Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18*<sup>138</sup>). Salinity decreases gradually from the bay to the up-river ports. Draft is deepest in *fresh water*, and that is the draft of concern in considering UKC.

As previously discussed, all the ballast tanks were sounded after the casualty and every half-hour thereafter until the Master was satisfied there was no ingress of water into any of them other than no. 7 port tank. The tanks other than no. 7 port and starboard all remained empty after the casualty, as verified by all the independent inspectors. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 75:2-77:2*<sup>139</sup>, *77:15-18*<sup>140</sup>, *81:16-25*<sup>141</sup>, *83:4 to 84:9*<sup>142</sup>; *Trial Tr. Day 10, October 6, 2010, Hall at 171:19-172:23*<sup>143</sup>, *175:7-176:1*<sup>144</sup>, *185:6-188:2*<sup>145</sup>).

If river water had somehow flowed into the ballast system, it would not have distributed itself evenly among the 14 wing ballast tanks, which are situated along the ship's length on both sides. The ingress of any extra ballast water through leakage would have manifested itself as a change in the ship's fore-aft trim and/or a list to port or starboard, and would have been noticed by all on the bridge, including the Coast Guard security team who rode the ship on the up-river trip. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 145:24-146:18*<sup>146</sup>; *Trial Tr. Day 24, November 9, 2010, Haley, at 195:16-196:1*<sup>147</sup>; *Trial Tr. Day 34, December 2, 2010, Betz, at 110:8-111:15*<sup>148</sup>). The Docking Pilot and ship's officers testified there was no list or uneven trim before the accident. The ship was upright as she came through the anchorage before the accident. This was confirmed by CARCO's security video on the pier. (*Trial Tr. Day 14, October 14, 2010, Markoutsis, at 34:4-36:1*<sup>149</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-17:16*<sup>150</sup>; *Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7*<sup>151</sup>).

Notably, CARCO's expert witness, Petrie, claimed he had no opinion about how likely or unlikely it was that the supposed extra ballast water would distribute itself equally so as not to alter the ship's trim or cause her to list. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 105:16-106:1*<sup>152</sup>).

Additionally, if extra ballast water had been secretly pumped out after the casualty, there would have remained a wedge of water at the forward ends and downward-sloping sides of the ballast tanks, because the ship was trimmed (*i.e.* down) by the bow and listing to the port side. The tank's drainage valves, through which the ballast pump was connected to the pipe suction, were at the aft end of each tank. Therefore, when the pumps lost suction, a wedge of unpumpable water would have remained at the forward ends of the tanks, where the pump suction at the aft ends could not reach. When the ship's trim and list were corrected, this water



would have flowed back beneath the sounding points on deck, and been evident to the Coast Guard inspectors and the numerous surveyors who inspected the ballast tanks. All the surveyors reported all the port and starboard ballast tanks were empty, other than no. 7 port and starboard, and no. 4 starboard, into which ballast had been placed to help make the ship upright. (*Trial Tr. Day 11, October 7, 2010, Hall, at 15:21-17:5*<sup>153</sup>; *Trial Tr. Day 11, October 7, 2010, Bowman, at 142:18-144:20*<sup>154</sup>; *Ex. P-481 at Athos 011073 (Discharging Rate Progress Log)*; *Ex. P-424 BSI 0184 (BSI Ullage Report dated Nov. 29, 2004)*).

Pumping out ballast would have changed the ship's trim and/or list, which would have been noticed by the Coast Guard and other inspectors. In fact, the list and trim remained the same until the ship was brought upright on November 28. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 11:7-19*<sup>155</sup>, *Trial Tr. Day 11, October 7, 2010, Bowman, at 153:17-154:4*<sup>156</sup>; *Trial Tr. Day 26, November 15, 2010, Petrie, at 75:4-76:3*<sup>157</sup>; *Trial Tr. Day 9, October 5, 2010, Umbdenstock, at 23:21-24:3*<sup>158</sup>, *35:23-36:3*<sup>159</sup>).

CARCO wrongly asserts that the ship's log proves ballast water was secretly pumped out because it shows fuel consumption increased after the casualty, which CARCO claims was used to run a pump. Issues Br. at 6. But its own witness, Petrie, admitted this was supposition, as fuel was used to run the boiler to generate steam for the heating coils in the cargo tanks. (*Trial Tr. Day 26, November 15, 2010, Petrie, at 95:2-7*<sup>160</sup>, *95:23-96:10*<sup>161</sup>). CARCO's Voyage Instructions required the vessel to maintain the cargo at 135° F. as the ship sailed from the warm temperatures of Venezuela to the frigid temperatures of Paulsboro. (*Ex. 360 (Voyage Instructions)*). The deck log shows the outside water temperature fell from 25°C. on Nov. 24/25 to 11°-12°C. on Nov. 25/26 and 7°-8°C. on Nov. 26/27, requiring more heat to maintain the cargo temperature. (*Ex. D-165 at Athos 018769-74 (Bridge Log)*).

CARCO pointlessly mentions that an ingress of “just 200 tons” of water on one side of the ship could cause a list that would increase the draft on that side by 11”. Issues Br. at 27. The witnesses and CARCO’s security video show there was no such list as the ship crossed the anchorage. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-17:16*<sup>162</sup>, *18:7-12*<sup>163</sup>, *19:20-23*<sup>164</sup>; *Trial Tr. Day 14, October 14, 2010, Markoutsis, 34:2-35:11*<sup>165</sup>; *Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7*<sup>166</sup>).

Similarly pointlessly, CARCO states that Bowman said “just 349.8 tons of unreported additional ballast” would have increased the draft to 37’. Issues Br. at 27. CARCO’s question to Bowman misinterpreted the document on which it was based. The document showed that 349.8 tons in *each* of 7 port and starboard ballast tanks would have increased the draft that much. (*Trial Tr. Day 12, October 12, 2010, Bowman, Day 12, at 79:12-80:18*<sup>167</sup>, *Ex. D-1942*). Each inch of draft increase on an even keel required about 150 tons of ballast water. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 140:17-141:3*<sup>168</sup>). To increase the draft by 5” (*i.e.* 37’ minus 36’ 7”) would have required about 750 tons of ballast, which is consistent with 349.8 tons in *each* of the two tanks. In any event, the argument is pointless because there is not an iota of evidence that there was any extra ballast, not to mention that the 37’ draft on which CARCO bases this argument would have been covered by the safe port warranty.

Finally, there was nothing wrong with the ballast system that would cause it to leak hundreds of tons of ballast water, and therefore the Master did not “fail[] to inform [the Pilots] that the ship’s ballast system was malfunctioning.” Issues Br. at 25. Contrary to CARCO’s allegations, valves did not and *could not* open and close on their own, there were no leaks in ballast lines at the time of the voyage, and the gauges for determining the volume of water in the ballast tanks were not inoperable. Issues Br. at 35, 105 *et seq.*

First of all, after the ship listed, the sea valve was checked by the pumpman who confirmed it was closed and lashed with rope, as was the practice on board ATHOS I, as on most ships, so no river water could have gotten into the ship. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 59:21-60:9;*<sup>169</sup> *74:4-13;*<sup>170</sup> *Figueros Dep. Vol. 2, August 2, 2007, at 160:3-11, 15*<sup>171</sup>).

The valves in the ballast lines did not and *could not* open and close on their own, because they were hydraulically operated, and could not move without pressure from a hydraulic pump. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 62:16-63:16*<sup>172</sup>, *73:6-10*<sup>173</sup>; *Trial Tr. Day 17, October 20, 2010, Ragousis, at 56:11-21*<sup>174</sup>).

The matter of ballast valves supposedly “opening and closing” was merely an intermittent electrical problem that caused the indicator lights to flash on and off, so the crew always held the valve switch closed until the light extinguished. If necessary, the positions of the valves could be confirmed by checking the positions of the valve actuators in the cargo console panel. (*Trial Tr. Day 5, September 28, 2010, Zotos, at 11:6-12*<sup>175</sup>, *68:16-69:18*<sup>176</sup>, *71:22-72:7*<sup>177</sup>; *Trial Tr. Day 17, October 20, 2010, Ragoussis, at 77:19-78:6*<sup>178</sup>, *93:21-94:17*<sup>179</sup>).

The fact that the sea valve was closed and lashed, and the manual pump by-pass valves in the pump-room were closed, makes irrelevant CARCO’s allegation about leaks in the ballast lines, because there was no water admitted into those lines. Further, whatever leaks there had previously been in ballast lines were not the gushers CARCO implies that would admit hundreds or thousands of tons of ballast water into the tanks, and had already been repaired by the crew with metal clamps fabricated for that purpose. If the ballast system was leaking before they arrived in Paulsboro, it would have leaked afterwards too, and there is no evidence of this anywhere. No leaks were reported by the inspectors after the casualty, so there is no reason to believe there were any leaks before the casualty.

The ballast lines were pressure tested in the presence of a Lloyd's Register Classification Society surveyor to confirm their integrity during a routine dry docking at Dalian, China in May 2004, just six months before the accident, and were found in satisfactory condition. (*Ex. P-1430 at ¶16 (Ragoussis Statement); Trial Tr. Day 17, October 20, 2010, Ragoussis, at 43:11-18<sup>180</sup>*). It is not unusual for ballast lines to develop pinhole leaks due to corrosion from the inside because ballast water is most often salt water. *Ex. P-1430 at ¶17*. In September 2004, pinhole size leaks that had developed in nos. 1 and 2 port and 5 starboard tanks were repaired by clamps in the standard fashion until permanent repairs could be carried out. (*Ex. P-549 at Athos 030634 (WIFUM Report dated October 21, 1994); Ex. P-1310 (TST Internal Assessments/(5)(D), dated September 23, 2004 at Athos 011447, at ¶45*). Additionally, on November 4, 2004, Chief Officer Zotos found leaks in the forward ballast tank and the no. 1 port ballast tank and, with the pumpman, fitted clamps to the ballast lines in those tanks. (*Trial Tr. Day 4, September 27, 2010, Zotos, at 38:25-40:10<sup>181</sup>; Trial Tr. Day 5, September 28, 2004, Zotos at 58:2-19<sup>182</sup>*).

On November 6, 2004, just weeks before the casualty, all the ballast tanks were inspected by Lloyd's Register Classification Society and the vessel received the highest rating under the Continuous Assessment Program. (*Ex. P-1310 at Athos 002601-002602, 002604 (Surveys/Assessments (3)(m); Ex. P-351 (Condition Assessment Programme Certificate, issued December 27, 2004); Ex. P-352 (Condition Assessment Programme Certificate, issued March 20, 2005)*)).

No inspectors reported any leaks in the ballast lines after the casualty. At the subsequent dry docking in Mobile, Alabama in January 2005, permanent repairs were made to the temporarily repaired ballast lines in nos. 1 and 2 port and 5 starboard tanks. No other repairs were required in any ballast lines. (*Ex. P-1310 (Tsakos Internal Assessments) (5)(E), 12/9/04, at*

*Athos 011439, ¶18, and (5)(F), 1/26/05, at Athos 010093 (Item DD-18, showing ballast line is no longer listed as an outstanding item from 12/9/04 assessment report); Chasan Dep., Vol. II, September 27, 2007, at 99:22-100:1<sup>183</sup>).*

The pneumatic remote mercury ballast gauges were not inoperable, but were imprecise, which is a common problem in the industry. Therefore, the crew never relied on the gauges for an accurate reading of volume, but sounded the ballast tanks from the sounding points on deck that were there for that purpose. (*Trial Tr. Day 5, September 28, 2010, Zotos, at 10:9-24<sup>184</sup>, 81:13-82:1<sup>185</sup>; Trial Tr. Day 17, October 20, 2010, Raggousis, at 51:8-16<sup>186</sup> 52:21-53:11<sup>187</sup>, 90:6-91:23<sup>188</sup>*). Repairs had been scheduled the week of the casualty. (*Ex. P-329 at Athos 012395; Trial Tr. Day 14, October 14, 2004, Markoutsis, at 55:9-57:6<sup>189</sup>*).

Finally, CARCO adduced no expert testimony that any ballast system valves could open and close on their own, or how any river water could have gotten into the ship when the sea valve and manual pump-room valves were closed, no pump was running, and the hydraulically-operated ballast tank valves could not possibly open and close on their own.

**B. ATHOS I Commenced Her Approach At The Appropriate Time And Stage Of Tide.**

It appears CARCO contends that the ship should not have entered the anchorage when she did because her calculated under-keel clearance allegedly would have been inadequate in some spots, notwithstanding that its experts admit the UKC was more than adequate where she hit the anchor. Its contention is wrong as a matter of fact and as a matter of law with respect to proximate cause. The flood current began to run before ATHOS I entered the anchorage, as required by the guidelines of the Docking Pilots Association. The tide had been rising for about one hour before the ship made her approach. To be clear, the tide may begin to rise before the

flood current begins to run, although at a slower rate initially. Her under-keel clearance was sufficient at the site and time of the casualty, at the project depth of 40' at MLLW, and at the actual shallowest spot in the approach, which was at least 38.6' deep when the ship was there (after accounting for Cole's testimony that the tide was about 0.2' below MLLW). The ship was where she was supposed to be, at the time she was supposed to be there, on a draft that conformed to CARCO's Voyage Instructions. Therefore, she was entitled to rely upon the protection of the safe port warranty.

CARCO's rhetorical flourish that the ship proceeded with the "least possible under-keel clearance margin of safety" is simply wrong, if it was directed at the anchorage. Issues Br. at 95. It appears, however, that this rhetoric was directed at the up-river transit. It was still wrong, but the up-river transit has no bearing on the UKC in the anchorage, or on the casualty.

**1. The acceptable safety margin for under-keel clearance on a slowly maneuvering vessel is approximately 5% of the ship's draft, or about 1' 10" on a draft of 36' 7".**

The relevance of the time and stage of tide is the provision of adequate under-keel clearance. In estimating anticipated UKC, ships allow a safety margin to account for squat and for the risk of reasonably foreseeable obstructions on the bottom of a waterway. (*Trial Tr. Day 24, November 9, 2010, Haley, at 147:13-19*<sup>190</sup>, *170:22-171:9*<sup>191</sup>; *Trial Tr. Day 29, November 18, 2010, Anderson, at 78:17-23*<sup>192</sup>, *118:13-18*<sup>193</sup>, *119:15-120:5*<sup>194</sup>; *Trial Tr. Day 24, November 9, 2010, Grenier, at 87:22-88:6*<sup>195</sup>, *89:17-21*<sup>196</sup>). *In re Lloyd's Leasing Ltd.*, 764 F. Supp. 1114, 1124 (S.D. Tex. 1990). The anchor was not the sort of foreseeable obstruction accounted for by the usual safety margin, as all the witnesses agreed and the Third Circuit determined. (*Trial Tr. Day 14, October 14, 2010, Markoutsis at 59:5-15*<sup>197</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel at 26:10-27:2*<sup>198</sup>; *Trial Tr. Day 34, December 2, 2010, Betz at 99:12-19*<sup>199</sup>; *Trial Tr. Day 17,*

*October 20, 2010, Bolton at 136:3-9;*<sup>200</sup>, *139:24-140:2*<sup>201</sup>; *Trial Tr. Day 25, November 10, 2010, Bergin, at 135:15-136:2*<sup>202</sup>; *Trial Tr. Day 24, November 9, 2010, Haley, at 176:18-177:8*<sup>203</sup>); *In re Frescati Shipping Co.*, 718 F.3d 184, 206 & n.25.

For a ship under way at transit speed, some prefer a safety margin of about 10% of draft. For a slowly maneuvering ship, like ATHOS I, an acceptable margin is approximately 5% of draft, because squat is negligible at slow speeds. (*Trial Tr. Day 34, December 2, 2010, Betz, at 86:22-87:21*<sup>204</sup>, *100:7-101:13*<sup>205</sup>, *105:14-16*<sup>206</sup>; *Trial Tr. Day 13, October 13, 2010, Brooking, at 80:1-12*<sup>207</sup>; *Trial Tr. Day 15, October 18, 2010, Hajimichael, at 85:11-19*<sup>208</sup>).

The 5% standard is not a fixed rule in all ports and circumstances. In some ports, UKC for slowly maneuvering ships is just reduced to a flat number. In the port of Los Angeles, for example, it is 1' 6". (*Trial Tr. Day 34, December 2, 2010, Betz, at 100:4-101:13*<sup>209</sup>). CARCO itself required only one foot of under-keel clearance at its Paulsboro terminal. (*Ex. D-766, p. 5, ¶ 47. (Marine Operations Guidelines)*).

CARCO's nautical expert, John Grenier, agreed with Judge Fullam's observation that, at the slow speed ATHOS I was making when she struck the anchor, "squat had nothing to do with it." (*Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8*<sup>210</sup>). Grenier refused to offer an opinion about what degree of under-keel clearance was acceptable while maneuvering across the anchorage. (*Id. at 117:1-11*<sup>211</sup>).

Another of CARCO's nautical experts also admitted that at the slow speed the ship was making ("maybe a knot or so"), there was "not much" squat. (*Trial Tr. Day 25, November 10, 2010, Bergin, at 133:20-134:15*<sup>212</sup>).

No other CARCO expert offered an opinion of how much squat, *if any*, ATHOS I experienced as she slowly crossed the anchorage.

According to Docking Pilot Bethel, when ATHOS I entered the anchorage, her speed was under 2 knots and squat was not a problem. (*Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 15:1-3*<sup>213</sup>, *15:14-16*<sup>214</sup>). At the time she finished turning around, before striking the anchor, her speed was minimal. The Master testified that, when ATHOS I was turned sideways, her speed was practically zero, and squat was not a problem. (*Trial Tr. Day 14, October 14, 2010, Markoutsis, at 36:10-19*<sup>215</sup>).<sup>9</sup>

In the face of all the testimony that squat was not a factor, it is remarkable that CARCO would claim the Master testified that squat increases dramatically when a ship is being pushed sideways. Issues Br. at 84. What the Master actually said was that he didn't know. (*Trial Tr. Day 15, October 18, 2010, Markoutsis, at 47:9-12*<sup>216</sup>). CARCO tried to impeach the Master with deposition testimony, but, as Judge Fullam recognized, that cross-examination was utterly unclear. (*Id. at 47:17-49:8*<sup>217</sup>). No CARCO witness testified at trial that squat increases dramatically when a ship is being pushed sideways.

Frescati's expert witness on pilotage confirmed there is no such thing as sideways squat on a Panamax ship being pushed sideways by tugs. (*Trial Tr. Day 34, December 2, 2010, Betz, at 105:14-22*<sup>218</sup>).

In light of CARCO's experts' admissions that squat had nothing to do with the casualty, it is ill-conceived for CARCO to claim the Master and Docking Pilot made a choice "to proceed through the anchorage without a safety margin at low tide while ignoring the hydrodynamic effect of squat." Issues Br. at 15, n. 10.

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<sup>9</sup> The ship's average speed in the anchorage was less than 1 knot. She entered at 8:48 p.m. and struck the anchor at 9:02 p.m., 900 feet from the pier. *In re Frescati Shipping Co.*, 718 F.3d at 192. She thus covered 1,100 feet in 14 minutes, which is 4,714 feet per hour. A knot is 1 nautical mile per hour and a nautical mile is 6,076 feet. Thus, 4,714 feet per hour equals 0.78 knot.



Notwithstanding the undeniable fact that squat does not carry much, if any, weight in determining what UKC is safe on a slowly maneuvering ship, CARCO nevertheless contends the applicable standard should be the same 10% as it is for a ship under way. Issues Br. at 71, 84-85, 97. CARCO goes even further, arguing the ship should have had the “maximum” safety margin. Issues Br. at 27. We don’t know what that means, but it is plain that good seamanship requires reasonable care and compliance with reasonable standards, not excessive care or standards. As previously noted, if more than ordinary skill and care are required to avoid a hazard, a port is not safe. *Time Charters, supra* § 10.46, at 208.

As stated by the Court of Appeal in *The Eastern City*, [1958] 2 Lloyd’s Rep. at 137 (quoting *The Stork*, [1955] 1 Lloyd’s Rep. 349, 373 (Q.B. 1955)), a Master need not doubt a charterer’s assurance that a port is safe, make independent inquiry, or, it follows, take undue precautions:

Further, there is a duty to behave with ordinary reasonable prudence so as to minimize damages . . . . But this does not involve, nor in practice would it be reasonable or convenient, that where charterers have the contractual duty of ordering a ship to go to some place designated safe, and where the ship has the contractual duty of obeying the order, the ship must always doubt the validity of the order and must not proceed until by making some reconnaissance or by seeking information extending beyond that available to a reasonable and prudent ship’s master, there has been a satisfactory verification that the place designated safe is in fact so.

CARCO’s argument about a 10% safety margin really doesn’t matter, because ATHOS I’s UKC was 9.3% of her draft of 36’ 7”, based on the 40’ project depth, and *more than 12% at the casualty site*. Nevertheless, we are constrained to address the subject of what margin of safety was reasonable.

Prior to August 1999, ships with drafts of 36’ to 40’ were required to wait until two hours before high tide before crossing the anchorage, or three hours in the Pilot’s discretion. (*Ex. D-*

795 (*Letter dated August 13, 1998 from Moran Towing to CARCO Port Captain Kamat*)).

CARCO requested that all its invited ships be permitted to berth at *any* time and stage of tide, because it wanted to expedite through-put at its plant and avoid waiting time and demurrage (delay charges) on ships waiting for higher tide. ATHOS I's demurrage rate, for example, was \$42,000 per day. (*Ex. P-357, Part I, Clause I; Quillen Dep. September 2, 2010, at 11:10-12:9*; <sup>219</sup>; *Ex. P-48 at § E (CARCO Port Captain R. Kamat's Summary of Attendances and Achievements for 1998)*).

The Docking Pilots Association gave CARCO's request much thought, polled its entire membership of 16 Docking Pilots, and concluded it was safe to broaden the stage of tide for ships to approach, albeit not as wide as the 24 hours CARCO requested. Ships with a draft up to 37' 6" were permitted to approach CARCO from the beginning of flood current until one hour after high water. Ships with greater drafts had to wait until three hours before high tide. (*Ex. P-52 (Letter dated August 11, 1999 from Docking Pilots Association to CARCO Port Captain Kamat); Quillen Dep. September 2, 2010, at 11:10-16:16*<sup>220</sup>, *54:23-57:15*<sup>221</sup>; *Exs. P-50 (Memorandum dated July 22, 1999 from V. Quillen to All Pilots), P-51 (Memo dated August 5, 1999 from V. Quillen to All Pilots), P-52 (Letter dated August 11, 1999 from Docking Pilots Association to CARCO Port Captain Kamat)*). These new guidelines were incorporated in the Docking Pilots Association's book of guidelines. (*Ex. D-1600, at p. 28*). Additionally, the Association continued to monitor the effectiveness of the guidelines after they were implemented in August 1999. (*Quillen Dep. September 2, 2010, at 58:13-59:10*<sup>222</sup>).

The requirement that flood current had begun was not related to the depth of water or under-keel clearance. To be clear: the tide begins to rise after low water is reached, but before the flood current begins to run, and rises at a slower rate at first. (*Trial Tr. Day 6, September 29,*

2010, *Capone*, at 127:25-129:1<sup>223</sup>; *Trial Tr. Day 21, November 3, 2010, Cole*, at 56:4-17<sup>224</sup>).

Obviously, entering an anchorage at the beginning of flood current means the depth of water will have risen some from its lowest height in the tide cycle. However, the requirement for flood current had to do with the effect of the direction of the current on a ship's maneuverability.

CARCO wrongly alleges that Docking Pilot Bethel had a "local practice," contrary to the guidelines, to dock tankers at CARCO not earlier than three hours before high tide. Issues Br. at 100, *also id.* at 10. In fact, what Bethel said was that the tankers he previously docked there had arrived off Paulsboro at that hour because they were covered by the guideline for ships with a draft *in excess of 37' 6"*. (*Trial Tr. Day 8, October 4, 2010, Bethel*, at 61:11-17<sup>225</sup>; *Ex. D-1600 at p. 28*).

Indeed, Bethel said he would never depart from the guidelines without very good reasons, because the guidelines had been agreed with the terminals "in order to get their vessels in and out of the berths faster." (*Trial Tr. Day 8, October 4, 2010, Bethel*, at 76:9-17<sup>226</sup>). "You have to have a very good reason not to follow those guidelines or else you won't have a job." *Id.* at 76:18-23<sup>227</sup>. Therefore, Bethel would never have had a "local practice" to hold off docking a Panamax size ship with less than a 37' 6" draft, in contravention of the guideline permitting berthing at the start of flood current.

Moreover, contrary to CARCO's statement, Issues Br. at 10, Bethel did not say the ships he docked at CARCO did not contact the anchor, but rather said they might well have contacted the anchor without anyone realizing it. (*Trial Tr. Day 8, October 4, 2010, Bethel*, at 55:25-56:6<sup>228</sup>).

The project depth at which the U.S. Army Corps of Engineers was tasked to maintain the anchorage was 40' at MLLW. On a draft of 37' 6" pursuant to the guidelines, the clearance at the very start of flood current would be about 2' 6", which is 6.6% of that draft.

Absent evidence that the collective membership of the Docking Pilots Association is incompetent, and accepting that their guidelines represent the acceptable safe practice *at Paulsboro*, the guidelines' 6.6% margin of under-keel clearance *affirmatively disproves CARCO's assertion that the customary safe margin for a slowly maneuvering ship is 10%*, and is more consistent with the expert testimony that the relevant margin is approximately 5%.

Paulsboro is unusual in requiring that all tankers be pushed slowly sideways across the anchorage, whether they berth port side to CARCO's pier or starboard side to. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 51:25-52:3*<sup>229</sup>). *The issue before this court is the acceptable practice regarding under-keel clearance at Paulsboro, not the alleged custom elsewhere or in other circumstances! The Pilots' guidelines are the evidence of the local safety standard.*

Contrary to CARCO's repeated contention, no company policy of Frescati required a 10% UKC at Paulsboro. Issues Br. at 20, 71, 75, 84, 97. Frescati's written policy discussed a 10% margin, and stated further: "However, in certain cases, and in particular during in-harbor transits or while alongside it may be necessary to reduce the clearance further still. An under-keel clearance of approximately 5% of the vessel's maximum draft is adequate for those circumstances." (*Ex. D-20 (Vessel Operations Procedures Manual)*). ("Maximum draft" refers to the deepest draft in a case where, for example, the draft at the bow might differ from that at the stern, which was not the case here.)

Trial Judge Fullam was quick to recognize that Frescati's written policy called for a 5% safety margin for a ship maneuvering in a harbor, seeing right through CARCO's expert's

testimony that Frescati's policy required a 10% margin at Paulsboro. (*Trial Tr. Day 27, November 16, 2010, Daggett, at 137:1-13<sup>230</sup>; Ex. D-20, p. 729-30 (Vessel Operation Proceeding Manual)*)).

CARCO wrongly asserts that ATHOS I's Master admitted Frescati's 10% policy was applicable. Issues Br. at 84-85. What the Master actually said was:

Q. Now, if you take your company's ten-percent UKC policy and apply it to your assumption of 38 feet next to the pier, the ATHOS I, as a moored vessel, would violate that policy, wouldn't it?

A. I remember something also about five percent on this policy of the company, but I don't recall now because we have another policy now.

(*Markoutsis, Day 15, at 21:25-22:6*).

CARCO relies on the next question and answer, at 22:7-9:

Q. Okay. But you would agree this would violate the ten percent?

A. For the ten percent, yes.

The Master's agreement with counsel's arithmetic (that there is less than a 10% difference between a draft of 36' 6" and a depth of 38' at the berth) is not an admission that a 10% policy was applicable. The Master said there was a 5% policy, as quoted above.

Similarly, CARCO wrongly cites the testimony of Frescati's Quality Assurance Manager, Alan Johnson, in support of its incorrect allegation that Frescati's policy required a 10% UKC and this was an industry standard. Issues Br. at 71. Johnson said no such thing in the cited testimony or anywhere else. He merely affirmed CARCO's counsel's statement that Frescati's policy required UKC of "10 percent under certain circumstances, and 5 percent under other circumstances." (*Trial Tr. Day 16, October 19, 2010, Johnson, at 187:14-21<sup>231</sup>*).

The President of ATHOS I's management company confirmed a 5% policy was applicable at Paulsboro, as did her Second Officer, who prepared the voyage plan for the

Master's approval. (*Trial Tr. Day 15, October 18, 2010, Hajimichael, at 85:11-19*<sup>232</sup>; *Trial Tr. Day 16, October 19, 2010, Hajimichael, at 76:13-22*<sup>233</sup>; *Caro Dep. dated October 18, 2006, at 178:11-180:23*<sup>234</sup>).

**2. Flood current had begun before ATHOS I entered the anchorage.**

Vessels using tugs were required by the tug companies to use Docking Pilots, and the Docking Pilots followed the guidelines *agreed with the terminals*, in the absence of very good reasons to disregard them. (*Trial Transcript, Day 8, October 4, 2010, Bethel, at 42:10-12*<sup>235</sup>, *76:6-23*<sup>236</sup>). The Docking Pilots Association deemed it safe for vessels with a draft up to 37' 6" to approach CARCO during a window from the beginning of flood current until one hour after high water. This guideline was agreed by the Docking Pilots pursuant to CARCO's own request, *id*; *In re Frescati Shipping Co.*, 718 F.3d at 195 n.7; Ex. D-1600, at 28.

CARCO erroneously alleges that flood current had not yet begun when ATHOS I turned out of the channel to enter the anchorage at 20:48 hours, and attacks the River Pilot and Docking Pilot for not knowing this supposed fact when they were guiding the ship. Issues Br. at 81-82.

George Cole, upon whom CARCO relies for its contention that the flood current did not begin until 20:52 hours, acknowledged this was merely a calculation, based on the predicted current at the "Delaware entrance reference station" 80 miles down-river, and that actual currents may vary from the predictions. (*Trial Tr. Day 21, November 23, 2010, Cole, at 63:8-64:8*<sup>237</sup>, *72:4-7*<sup>238</sup>, *123:18-124:15*<sup>239</sup>, *125:20-23*<sup>240</sup>). He calculated the current should have been ebbing when the ship entered the anchorage at 20:48, but admitted he did not know that for a fact. (*Id. at 124:6-15*,<sup>241</sup> *125:1-5*,<sup>242</sup> *125:20-126:8*<sup>243</sup>).

Cole conceded he would defer to *the on-the-scene visual observations of the Pilots on board the ship*, (*id. at 126:9-127:14*):

“Q. Okay. Now, the person who would best know what the current was doing when the ship was leaving the federal channel, and proceeding in its approach to the berth, would be the pilot, correct?

A. It could be. Certainly he would have been in a position to observe it. If he used good methods observing it, and measured the velocity and direction, then that would be a valid observation.”

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“Q. Okay. But he could observe whether the current was still ebbing, or whether it had begun to flood, or what stage it was at, couldn’t he?

A. Yes, he could.

Q. And he could do that by looking at stationary objects and seeing a tail from them?

A. That would be one way of observing the direction of the flow.

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Q. And do you have any reason to disagree with [docking pilot] Captain Bethel?

A. If -- if -- if it was clear, and that is a correct statement, that could indeed be the case”.

Contrary to CARCO’s assertion, “official NOAA data” did not show flood current began at 20:52 hours at Billingsport Range.<sup>10</sup> Issues Br. at 81. Rather, that was a calculation, based on a prediction of what the velocity and direction of the current 80 miles away was expected to be doing, but Cole deferred to the Pilots who *saw* the flood current was running to say what direction it was actually moving..

The Pilots saw that the flood current was running by referring to the “tail” of water that ran around buoys in the water and other visual landmarks. (*Trial Tr. Day 2, September 22, 2010*,

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<sup>10</sup> The up-river channel is divided into named ranges as the channel shifts direction. The ranges near CARCO’s terminal are Tinicum, where the Docking Pilot boarded, Billingsport, where he took the conn, and Mifflin, where he turned into the anchorage.

*Teal, at 43:24-44:12*<sup>244</sup>; *61:7-10*<sup>245</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-9:20*<sup>246</sup>, *93:20-25*<sup>247</sup>, *94:1-16*<sup>248</sup>. Indeed, Bethel testified *he could not have made a 180° turn to starboard if the flood current had not begun!* (*Id., at 25:5-10*<sup>249</sup>, *93:20-25*<sup>250</sup>). No CARCO expert sought to controvert that straightforward fact.

Teal testified he saw the flood current had started and the tide was rising before the Docking Pilot took over at 20:40. (*Trial Tr. Day 2, September 22, 2010, Teal, at 43:24-44:14*<sup>251</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 13:19-21*<sup>252</sup>)<sup>11</sup> In fact, Teal observed the flood current was running at Buoy 5-T on Tinicum Range, which is where Bethel boarded at 20:30 hours. (*Trial Tr. Day 2, September 22, 2010, Teal, at 44:8-10*<sup>253</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 5:19-22*<sup>254</sup>, *13:19-21*<sup>255</sup>).

Further, Frescati's tide expert, Vincent Capone, opined that the tide had been rising about an hour when the ship contacted the anchor between 21:00 and 21:06. (*Trial Tr. Day 6, September 29, 2010, Capone, at 117:22-118:19*<sup>256</sup>). In other words, the tide had begun to rise between 20:00 and 20:06, and had been rising at least 42 minutes before the ship entered the anchorage at 20:48. It is not surprising that both pilots observed that the current was flooding when the ship reached Paulsboro because the tide had been rising for about an hour beforehand, tending to make the fact that it was flooding when the ship entered the anchorage more likely than not.

CARCO's case for vessel negligence is based on its robotic repetition of Cole's calculated timing of the flood current at 20:52, despite Cole's own deference to the Pilots'

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<sup>11</sup> CARCO tried to impeach Teal with his deposition testimony, but that testimony simply said the actual rise in tide was lower than the predicted rise. It had nothing to do with Teal's visual observation of when the flood current started to run. (*Trial Tr. Day 2, September 22, 2010, Teal, at 103:21-105:5*).



observations. Issues Br. at 19, 81, 99. The only relevant fact is that Bethel and Teal both *saw* that the current had begun to flood, and knew there was ample and increasing under-keel clearance for ATHOS I to cross the anchorage. Captain Markoutsis did not rely “blindly” on Bethel’s assumptions. Issues Br. at 81. He had eyes to see the flood current was running. It would be “fantastic to think that he couldn’t see that.” (*Trial Tr. Day 34, December 2, 2010, Betz, at 170:3-18*<sup>257</sup>).

In its characteristic rhetorical style, CARCO writes that Frescati relied “on the Docking Pilots Association’s ‘berthing window’ as some sort of license to ignore all mandatory regulations and procedures so they could plow through Federal Anchorage No. 9 at any time they pleased. . . .” Issues Br. at 81. That statement makes no sense for at least two reasons. First, CARCO asserts that the flood current had not yet begun, *id.* at 81-82, so the vessel would *not* have been in compliance with the berthing window if that were true. But it was not true.

Second, the statement appears to assume the tide was so far below the norm that the berthing window was unsafe on that particular day. That is not true either, because the tide was only about 2” below the charted depth when the ship turned into the anchorage, according to Cole, while ATHOS I’s draft was nearly a foot less than the 37’ 6” draft on which the berthing window was predicated, giving her ample under-keel clearance.

The depths entered on navigation charts are at *mean* lower low water. (*Trial Tr. Day 6, September 29, 2010, Capone, at 118:2-8*<sup>258</sup>; *Trial Tr. Day 21, November 3, 2010, Cole, 45:7-46:22*<sup>259</sup>). By definition, “mean” is an average, and actual water depth therefore may be lower than mean lower low water depth even after the tide has risen. It is normal and common for tides to be below MLLW, including a foot and more below. (*Trial Tr. Day 6, September 29, 2010,*

*Capone*, at 118:15-19<sup>260</sup>; Trial Tr. Day 21, November 3, 2010, *Cole*, at 87:6-88:2<sup>261</sup>, 91:1-12<sup>262</sup>, 91:25-97:2<sup>263</sup>).

Like the tide experts, both the River Pilot and Docking Pilot testified the tide was normal at the time the ship crossed the anchorage. (*Trial Tr. Day 2, September 22, 2010, Teal*, at 37:25-39:23<sup>264</sup>, 59:8-11<sup>265</sup>; Trial Tr. Day 8, October 4, 2010, *Bethel*, at 8:4-20<sup>266</sup>, 9:5-20<sup>267</sup>; 64:21-65:8<sup>268</sup>, 68:1-6<sup>269</sup>).

If it is CARCO's contention that the berthing window was unsafe in *normal* tidal conditions, it certainly had no such qualms when it asked the Pilots to broaden the window to permit docking at *any* stage of tide five years earlier. Further, it was insufficiently concerned even to inspect the approach to its berth for submerged hazards despite the reduction in UKC and increase in risk that resulted from its request to dock ships at lower stages of tide, in its continued disregard of the duty imposed upon wharfingers by the Supreme Court in *Smith v. Burnett*.

Having for five years accepted the benefits of the change in guidelines that it instigated, CARCO should not now be heard to complain that the guidelines were unsafe. In 1999, CARCO "made a business judgment when they decided" to increase the risk against which they warranted in the ensuing years. "Having made their bed, they must lie in it. We are not at liberty to 'second guess' their cost-benefit analysis." *First Pennsylvania Bank, N.A. v. Eastern Airlines, Inc.*, 731 F.2d 1113, 1122 (3d Cir. 1989).

### **3. The ship had adequate under-keel clearance at the casualty site.**

Both sides' experts calculated the average depth of water in the area around the anchor recovery site was 41.4' or 41.45' (about 41' 5") at MLLW on the day of the casualty, based on Government depth soundings taken two and three days later. (*Trial Tr. Day 6, September 29, 2010, Capone*, at 130:10-17<sup>270</sup>; Trial Tr. Day 22, November 4, 2010, *Traykovski*, at 49:17-

25<sup>271</sup>). CARCO's tide expert, Cole, calculated the tide at the time and place of the accident was 0.26' (3.12") above MLLW. (*Trial Tr. Day 21, November 3, 2010, Cole, at 83:15-84:23*<sup>272</sup>). On that basis, the average depth in the area around the anchor at the time of the casualty was about 41' 8" after adding Cole's tidal height to the MLLW depth.

With an average water depth of 41' 8" and a draft of 36' 7", *the clearance between ATHOS I's keel and the river bottom was 5' 1"*. Thus, the under-keel clearance was well in excess of the relevant safety margin of 5% of draft, and also exceeded the 10% safety margin for ships moving forward at speed. *Ipso facto*, the ship approached at an appropriate time and stage of tide, as the Third Circuit recognized. *In re Frescati Shipping Co.*, 718 F.3d at 204 n.22. *CARCO's experts agreed the ship could not be faulted in these circumstances!* (*Trial Tr. Day 28, November 17, 2010 Daggett, at 25:22-25*<sup>273</sup>; *Trial Tr. Day 25, November 25, 2010, Bergin, at 134:16-135:14*<sup>274</sup>; *Trial Tr. Day 24, November 9, 2010, Grenier, at 122:16-123:5*<sup>275</sup>, *124:8-24*<sup>276</sup>; *Trial Tr. Day 24, November 9, 2010, Trial Tr. Day 24, November 9, 2010, Haley, at 176:18-177:8*<sup>277</sup>; *Trial Tr. Day 29, November 18, 2010, Anderson, at 120:14-19*<sup>278</sup>). Neither a draft of 36' 7" nor the time of approach *caused* the ship to strike the anchor.

**4. The ship had adequate under-keel clearance at the project depth of 40' at MLLW.**

The vessel's ample UKC at the anchor site is exactly what would be expected from complying with the Docking Pilots Association's guidelines for Paulsboro. With a project depth of 40' at MLLW and a draft of 37' 6", a ship would have 2' 6" of under-keel clearance before the tide began to rise. On a draft of 36' 7", ATHOS I would have had under-keel clearance of 3' 5", or 9.3% of her draft, at the project depth of 40' at MLLW.

CARCO speaks in rhetorical flourishes about its assertion that the tide was a foot lower than predicted, but downplays the fact that the actual water level was only 0.2' below the charted

MLLW depth when the ship entered the anchorage at 20:48, according to its tide expert, Cole. Issues Br. at 78, 98; (*Trial Tr. Day 21, November 3, 2010, Cole, at 71:17-72:7*<sup>279</sup>), and .26 feet above MLLW when the ship contacted the anchor at 9:02 P.M. This does not negate the fact that the ship had ample under-keel clearance. At a depth of 39.8' (39' 9.6"), the ship's under-keel clearance on a draft of 36' 7" would have been 3' 2.6", or 8.8% of her draft, well above a 5% safety margin.

Stated in simpler terms, ATHOS I's draft was nearly a foot less than the 37' 6" deemed safe at the beginning of flood current, so she could safely have proceeded across the anchorage on a foot less water depth than the 40' project depth, but for the anchor.

**5. The ship had adequate under-keel clearance at the shallowest spot in the approach.**

CARCO argues the ship should not have entered the anchorage when she did because the "controlling" depth against which under-keel clearance should be measured was 38' at MLLW, based on a single 38' sounding on the navigation chart near the channel. Issues Br. at 19- 20, 30, 73-75, 85, 96. However, the Third Circuit has already said there is no indication the ship attempted to dock at an inappropriate time. 718 F. 3d at n. 22. The Docking Pilots Association monitored the effectiveness of its guidelines from 1999 onward, (*Quillen Dep. September 2, 2010, at 58:13-59:10*<sup>280</sup>), and was still satisfied in 2004 that it was appropriate to begin the approach at the start of the flood current, notwithstanding a 38' sounding. Docking Pilot Bethel testified it was appropriate to begin the approach at the start of the flood current, having specifically considered and discussed the 38' sounding with the Master.

In fact, the Army Corps of Engineers' sounding at that spot was 38.8', not the 38' on the navigation chart, leaving more than 5% under-keel clearance; the ship did not go aground on that

spot; the echo-sounder, if not the entire ship, did not even pass over it; and the 38' sounding on the navigation chart had nothing to do with the anchor sitting on the other side of the anchorage.

The Master specifically asked Docking Pilot Bethel about that 38' sounding on the chart before beginning the approach, and was explicitly told it was of no concern. (*Trial Tr. Day 14, October 14, 2010, Markoutsis at 31:17-32:6*<sup>281</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 13:4-18*<sup>282</sup>, *71:19-24*<sup>283</sup>). In considering the 38' sounding, Bethel calculated that any shortfall in tide below MLLW would be gained back by the time he began his maneuver. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 10:3-7*<sup>284</sup>, *74:7-20*<sup>285</sup>). He was right, because the difference between the actual tide and MLLW was only about 2", according to Cole. (*Trial Tr. Day 21, November 3, 2010, Cole, Day 21, at 72:8-23*<sup>286</sup>).

CARCO also wrongly states that Bethel assumed only 37 feet of water was available at the alleged 38' spot because he knew the tidal height was supposedly a foot less than predicted. Issues Br. at 75, 84. First, it is fallacious to say that if the tide was a foot less than predicted, it would be a foot lower than the charted MLLW depth. For example, Cole testified that at 20:31 on November 26, the actual tide was 1.1' below the predicted tide at Billingsport Range because the predicted tide was 0.6' above MLLW, whereas the actual tide was 0.5' below MLLW, not 1.1' below MLLW. (*Trial Tr. Day 21, November 3, 2010, Cole, at 61:5-17*<sup>287</sup>).

More to the point, according to CARCO's expert, Cole, the tidal height was only 2.4" lower than the charted MLLW depth when the ship entered the anchorage, not 1'.

In fact, Bethel *observed* that the tide was *not* a foot below the predicted height. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-17*<sup>288</sup>, *9:5-20*<sup>289</sup>; *64:22-65:9*<sup>290</sup>, *68:1-6*<sup>291</sup>).

In fact, there was no 38' spot in the approach; the actual MLLW sounding was nearly a foot deeper than that. Soundings on navigation charts are entered in whole numbers, rounded

down to the nearest whole number. (*Trial Tr. Day 6, September 29, 2010, Capone, at 164:24-165:8*<sup>292</sup>). Depth surveys, however, are recorded to the tenth of a foot. A single-beam depth survey by the Army Corps of Engineers in June 2004, before the casualty, did not contain any soundings shallower than 40+’ in the anchorage within the approach. (*Ex. D-32 (June, 2004 Single Beam Survey of Mantua Anchorage)*).

A multi-beam sonar survey by the Army Corps on November 28, 2004, two days after the casualty, showed the shallowest soundings at the 38’ mark on the chart were actually 38.8’ (38’ 9.6”) and 38.9’ (38’ 10.8”) at MLLW, within a small area. (*Trial Tr. Day 6, September 29, 2010, Capone, at 163:10-165:7*<sup>293</sup>). If the actual water level was 0.2’ (2.4”) below the Army Corps’ MLLW sounding when the ship entered the anchorage, the shallowest point would have been 38.6’. On ATHOS I’s draft of 36’ 7”, that would have left under-keel clearance of 2’, which would satisfy a 5% safety margin.

The ship did not run aground on that spot, *supra*, and in fact may not have gone over it at all. Her echo sounder showed 6’ 6” of water beneath the keel there, (*Trial Tr. Day 33, December 1, 2010, Bowman, at 63:11-25*<sup>294</sup>; *Exs. P-464A (Echo Sounder Printout); D-2065A (Echosounder demonstrative)*), which means the echo sounder, and possibly the entire ship, did not go over that spot. (*Trial Tr. Day 14, Markoutsis, at 26:10-27:15*<sup>295</sup>); *Trial Tr. Day 8, October 4, 2010, Bethel, at 23:5-20*<sup>296</sup>); *Trial Tr. Day 2, September 22, 2010, Esplana, Day 2, September 22, 2010, at 163:17-165:11*<sup>297</sup>, *168:5-175:6*<sup>298</sup>); *Trial Tr. Day 3, September 23, 2010, Esplana, at 58:5-20*<sup>299</sup>).

Obviously, the ship did not encounter the anchor in that spot (assuming she passed over that spot at all), but 1,000’ away. The 38’ sounding was unrelated to and not causal of the casualty. The absence of proximate cause is illustrated by another of the Third Circuit’s

holdings. CARCO held out to vessels that the “allowable maximum draft” at its facility was 38’, which means the depth was greater than 38’. (*Ex. P-14, at ¶2 (Regulations for Vessels)*).

CARCO internally changed that maximum safe draft to 36’ just four days before ATHOS I arrived, because an October 2004 depth survey showed 36’-37’ shoals in several places within 137’ to 175’ in front of its berth. (*Exs. D-880 (E-mail from W. Rankine to R. Taylor, et al, dated November 22, 2004); P-995 (Extract from ST Hudson October 2004 Depth Survey)*). However, CARCO failed to tell ATHOS I about the change.

Frescati argued this amounted to negligent misrepresentation and was a cause of the casualty, because the vessel would have waited for high tide, had she been informed. The Third Circuit held, however, “any misrepresentation about the ship dock is factually irrelevant to the accident because it did not occur at the dock, but rather 900 feet out in the anchorage.” *In re Frescati Shipping Co.*, 718 F.3d at 213-14. Similarly, the alleged 38’ spot in the anchorage near the channel was factually irrelevant to the accident because it did not occur at that spot, but over 1,000’ away.

The Third Circuit said there is no indication the ship attempted to dock at an inappropriate time. *Id.* at 204 n.22. The Docking Pilots Association’s guidelines provided, and Bethel testified, it was appropriate to begin the approach at the start of flood current, notwithstanding the 38’ sounding.

Apart from the supposed 38’ sounding, CARCO also wrongly claims an Army Corps of Engineers Channel Statement dated January 30, 2004 proves the “controlling” depth in the anchorage was 37 feet, citing Exs. D-321 and D-1174 (both exhibits are the same document). *Issues Br.* at 75. In fact, the Army Corps’ Chief of Operations Division testified the channel statement mistakenly said the *project depth* was 37’, which was corrected to 40’ the next year.

(*Trial Tr. Day 10, October 6, 2010, DePasquale, at 101:8-10<sup>300</sup>, 108:24-109:9<sup>301</sup>; 111:13-112:7<sup>302</sup>*), discussing Ex. P-687, which is the same as Ex. D-1174. Again, the only 37' spot in the anchorage was in the north end, far from CARCO's approach. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 81:2-82:9<sup>303</sup>, 95:4-12<sup>304</sup>*); *Trial Tr. Day 10, October 6, 2010, (Trial Tr. Day 10, October 6, 2010, DePasquale, at 102:14-103:2<sup>305</sup>*).

**C. There was no draft qualification on the safe port warranty at the discharge port; even if the ship's arrival–Paulsboro draft were between 37' and 37' 6", which is denied, there would be no reason to deprive her of the safe port warranty.**

CARCO contends the ship's draft was greater than 37' because the uppermost point of the anchor allegedly was deeper than that, and therefore the vessel is not entitled to the benefit of the safe port warranty. Issues Br. at 28. CARCO's theories, however, do not put the ship's draft at any greater depth than the Docking Pilots Association's accepted safe draft of 37' 6" for making the approach at the start of the flood current. Therefore, before discussing CARCO's evidence regarding the depth of the anchor and the inference CARCO would like to draw from that about the ship's draft, it is important to understand that there was in fact no 37' qualification on the safe port warranty at the discharge port. Therefore, even if the ship's arrival-Paulsboro draft were between 37' and 37' 6", there would be no reason to deprive her of the safe port warranty. At the same time, we reiterate that this need not be addressed if this court finds that ATHOS I's draft was 37' or less, which the evidence proves was the case.

The Court of Appeals properly remanded any question of a 37' draft qualification on the warranty to this court. It said that, based on what it could "glean from the record," "the warranty made by CARCO appears to have covered the *Athos I* up to a draft of 37 feet." *In re Frescati Shipping Co.*, 718 F.3d at 204. "Of course, this is ultimately a factual matter for remand." *Id.* at n.20.



The record on appeal the court gleaned in discussing a 37' draft qualification on the warranty was not assembled to deal with any such issue, nor was such an issue addressed in the briefs or oral argument, because no one ever suggested such a qualification at trial or on appeal.

The Court of Appeals' reference to a 37' draft qualification was based on CARCO's Voyage Instructions to load up to 37' at Puerto Miranda, Venezuela. *Id.* at 204. The contract itself--the charter party--contained no conditions regarding the warranty itself, or regarding draft. (*Ex. P-357 (ASBATANKVOY Voyage Charter dated November 12, 2004) and D-170 (E-mail dated November 15, 2004 from Star Tankers to ATHOS I with Fixture Note)*). The charter party provided for several ranges of permissible loading and discharging ports besides Puerto Miranda and Paulsboro, which would naturally have differing depth and draft considerations. (*Exs. P-357 and D-170 at Special Provisions 1 and 2*). The Voyage Instructions, (*Ex. P-360*), designated CARCO's choice of loading and discharging ports, identified the cargo and supplier, issued heating instructions, and specified other operational details.

The Voyage Instructions specified "Quantity vessel loads to always be consistent with a 37 ft or less fw [fresh water] draft at load port." (*Ex. P-360 at Athos 000007*). It said nothing about an arrival draft at the discharge port. CARCO's Vessel Operations Coordinator, Sallie Wilson, testified the 37' draft instruction was due to a depth restriction at the load port in Venezuela. (*Wilson Dep. dated October 12, 2005, at 22:16-23:11*<sup>306</sup>). It had nothing to do with the Delaware River or Paulsboro, where the safe draft for approaching CARCO was 37' 6" at the commencement of flood current, and greater at higher stages of tide, as CARCO and the Docking Pilots Association had agreed.

As Ms. Wilson further testified, when a discharging port has a draft restriction, the voyage instructions will specify that the *arrival* draft at the *discharge port* should not exceed a

specified number. A draft restriction at a discharging port is not expressed as a specified draft on sailing from the loading port. (*Wilson Dep. dated November 28, 2007, at 27:25-29:8*<sup>307</sup>).

In fact, the illustrative voyage instructions about which Ms. Wilson testified above ordered another ship, the GENMAR STRENGTH, to load to an arrival draft of *39 feet* at Paulsboro, not 37 feet, just three months before the ATHOS I Voyage Instructions. *Id.* Additionally, CARCO's Port Manual stated its facility could safely accommodate vessels with a draft up to *38 feet*, not 37 feet, at any stage of tide. (*Ex. P-14 at ¶2. (Regulations for Vessels)*). That 38' draft in CARCO's Port Manual was the *only* draft restriction at Paulsboro that CARCO ever communicated to Frescati or the vessel!

There simply is no conceivable reason to infer that ATHOS I's *load port* draft restriction of 37' had anything to do with the *discharge port* of Paulsboro, or that the safe port warranty there was predicated on a 37' draft. Ms. Wilson's testimony conclusively shows they are unrelated. That testimony was not before the Third Circuit because the point was never at issue.

CARCO was keenly aware of the Docking Pilots Association's 37' 6" standard, not 37', for crossing the anchorage at the beginning of flood current, because CARCO itself had instigated that standard when it asked the Pilots to open the berthing window even wider than that. And CARCO knew that deeper draft ships were permitted at higher stages of tide. Again, there is no reason to think that CARCO or anyone else intended to limit the ship's draft on arrival at Paulsboro to 37'. Certainly, there is no reason to think the vessel would have understood there was such a limitation at Paulsboro based on an instruction that pertained to Venezuela.

Nor is there any basis for an inference that the draft on arrival at a discharge port has to be the same as the sailing draft at the loading port. A ship loading at a draft-restricted port can

maximize cargo intake by minimizing the volume of fuel oil on board on arrival there in order to minimize her draft, and then top off the fuel oil after loading and passing through the depth-restricted area. Fuel was not topped off in this case because the ship already had enough for the voyage to Paulsboro. But if additional fuel had been required to make the voyage, it was the vessel's option--and to both parties' advantage--to maximize cargo volume by topping off the fuel oil *after* loading. CARCO had no basis to expect that the draft on arrival at Paulsboro would be the same as the loading draft.

Another fact demonstrating the fallacy of a supposed 37' qualification on the warranty at the discharge port is seen in the Court of Appeals' suggestion that, if the ship's draft could not be determined, the warranty would be satisfied if the trial court finds CARCO provided the "promised 37 feet of water depth" above the anchor. *In re Frescati Shipping Co.*, 718 F.3d at 205. Again, because no one suggested a 37' qualification on the warranty at the discharge port, there was no reason for anyone to point out to the court in this context that a clearance of 37' would *not* be safe for a 37' draft ship. As previously discussed, a safety margin of under-keel clearance is required. An acceptable margin for a slowly maneuvering vessel is approximately 5% of the ship's draft, or 1' 10.2" on a 37' draft. Thus, a safe port warranty for a 37' draft ship cannot be predicated on a bare 37' of clearance above an obstruction. In shoreside terms, it would not be prudent to drive a 15' high truck under a bridge with an advertised clearance of 15'.

CARCO's argument that the *safe* port warranty does not include a *safety* margin is wrong on its face, and contradicts CARCO's own argument that a safety margin is necessary for good seamanship; nor does the requirement for a safety margin somehow morph into an admission of negligent navigation. Issues Br. at 27. Further, contrary to CARCO's argument, the safe port

warranty *is* an express assurance that a ship drawing 36' 7" is safe at the start of flood current. The Third Circuit explicitly held the warranty is an express assurance, and the safe practice at Paulsboro was to dock a ship with a draft up to 37' 6" -- a foot deeper than ATHOS I -- at the beginning of flood current, as CARCO well knew.

The charter party contained no draft qualification on the warranty at all, and the Voyage Instructions imposed no restriction on draft at the discharge port.<sup>12</sup> Absent an express condition on the warranty at the discharge port, the relevance of a ship's draft pertains only to the exercise of reasonable care by the vessel, not to the scope of the warranty. If the draft exceeds a safe level, the vessel could be guilty of negligence. That would not obviate the safe port warranty. Rather, if an obstacle reaches above a safe depth, a ship's unsafe draft could call for an apportionment of damages by reason of shared fault. The Third Circuit, and CARCO itself, acknowledged that damages may be apportioned in cases of shared fault. Issues Br. at 146-47. 718 F.3d at 205, n.23.

**D. CARCO cannot prove what the anchor's height was, or, therefore, that the ship's draft was unsafe.**

**1. CARCO cannot prove the ship's draft was unsafe on the basis of the anchor's hypothetical height.**

CARCO's theory that the ship's draft was greater than 36' 7" is based entirely on the hypothetical depth of the uppermost point of the anchor and the inference that the hull had to be at least equally as deep to contact the anchor. Issues Br. at 28. Specifically, CARCO contends the anchor lay prone on the river bottom, with its tripping palms pointed up and its flukes horizontal,

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<sup>12</sup> CARCO's naval architect expert, George Petrie, concluded that the ship loaded to a fresh water draft of 36' 6" at Puerto Miranda, in compliance with the Voyage Instructions.

based on the University sonar scan three years earlier and its experts' opinion about how the damages occurred. *See* appended diagram and photographs of the anchor.

CARCO cannot prove its theory because it has no plausible explanation, much less evidence, of how the draft could have changed from its admitted level of less than 37', given that it was impossible for "extra ballast" to have gotten in. Nor is there any direct evidence of the depth of the river bed and the orientation and height of the anchor above the river bed at the time and precise location where the ship contacted the anchor, not three years earlier.

CARCO's Issues Brief repeatedly refers to the prone orientation as the anchor's "natural 'flukes-down' position." Issues Br. at 28. What CARCO fails to acknowledge and cannot deny is that the anchor had another "natural" position. When set down at (or lifted up to) an angle of about 30° to the horizontal, the anchor's flukes rotated upward on their own momentum to an angle of about 65° to the horizontal, with the flukes pointed up and out, about 6' 6" high, as seen in Ex. D-1913 appended hereto. This was due to a low center of gravity that resulted from someone having cut off the anchor's shank. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 128:7-131:17*<sup>308</sup>; *Trial Tr. Day 9, October 5, 2010, Crosson, at 129:5-130:7*<sup>309</sup>; *Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:4-218:15*<sup>310</sup>). CARCO cannot deny this phenomenon, because it is on videotape. (*Ex. P-1601*).

In any event, CARCO's theory cannot prove the ship's draft was even as deep as the *safe* draft of 37' 6" adopted by the Docking Pilots Association, much less at an unsafe level. CARCO's prone-anchor, flukes-down theory at most would show the draft was a minimum of 37.46' at the time and place of the accident. This, in turn, is based on the allegedly horizontal position of the anchor in a sonar scan three years before the incident. *Showing the draft reached some minimum depth would not prove it was deeper than that minimum.*

If this court finds there was no 37' draft qualification on the safe port warranty at the discharge port, then a draft between 37' and 37' 6" would not affect the warranty, and would at the same time be a safe draft for approaching the berth at the start of flood current. The fact that the ship was damaged while proceeding on a safe draft and at an appropriate time and stage of tide "would indicate that the warranty had been breached . . ." *In re Frescati Shipping Co.*, 718 F.3d at 204-05.

CARCO's sonar expert, Traykovski, testified the shallowest depth of the uppermost part of the anchor (allegedly, the palms) was 37.2' at MLLW. (*Trial Tr. Day 22, November 4, 2010, Traykovski, at 50:17-51:3<sup>11</sup>*). Adding Cole's estimated tidal height of 0.26' above MLLW would bring the depth at the time of the accident--and the inferred draft of the vessel--to 37.46', or 37' 5.5", which would be less than the 37' 6" draft deemed safe for ships approaching CARCO at the beginning of flood current.

Please note that Frescati does not agree with CARCO's experts' estimate of the depth of the anchor. However, the purpose of the instant point is to show that even if CARCO's evidence were found to be a fact, it would not prove the ship's draft exceeded 37' 6".

## **2. CARCO's opinion does not prove Athos I's draft was greater than 36' 7".**

There are at least four flaws in CARCO's theory that the anchor lay prone on the river bed, so that its highest points, allegedly the palms, were deeper than 37', based on the University of Delaware sonar scan three years before the incident. First, there is no plausible explanation of how the ship's draft could have changed from that calculated by the ship's crew and verified by both side's experts. Second, according to Frescati's sonar expert, the one image taken from 2001 sonar data is insufficient to determine whether the anchor was "flukes-down," *i.e.* prone, or "flukes-up," some 6' 6" above the river bottom. Third, even if the anchor had been horizontal in

2001, that orientation could have changed in the ensuing three years if the anchor was knocked by another ship's hull or snagged by another ship's or barge's anchor or anchor chain, or it could have been pushed or dragged a few feet onto solid ground even if it remained allegedly horizontal. Fourth, the nature of the hull damage and the direction the ship was moving (astern and to port) shows the anchor was oriented with the flukes pointing up and out, about 6' 6" above the river bottom.

**(a) The 2001 sonar data was insufficient to determine the anchor's orientation or height off the riverbed when contacted by the ship on November 26, 2004.**

In August 2001, Professors Sommerfield and Madsen of the University of Delaware conducted a side scan sonar survey in a sedimentological and geophysical study of the Delaware River. Stipulation Respecting Undisputed Facts dated February 1, 2014, at ¶ 8. They had no interest in navigational obstacles, and did not adjust their sonar device's settings at levels that would pick up *detailed* images of objects on the river bottom. They produced only one scan of the place where the anchor was detected. While their survey was not designed to study submerged hazards, it *did* detect the anchor, because a target the size of the anchor is *easy* to detect. (*Trial Tr. Day 6, September 29, 2010, Fish, at 52:13-19*<sup>312</sup>, *60:19-62:4*<sup>313</sup>; *Trial Tr. Day 22, November 4, 2010, Traykovski, at 56:10-25*<sup>314</sup>; *Trial Tr. Day 6, September 29, 2010, Capone, at 143:23-145:17*<sup>315</sup>; *Long Dep. dated August 29, 2007, at 86:4-12*<sup>316</sup>).

Frescati's sonar expert, John Fish, is an internationally renowned expert on side scan sonar imagery, with years of hands-on experience, and a co-authorship of a widely-used scholarly text on the subject. (*Trial Tr. Day 6, September 29, 2010, Fish, at 29:9-30:4*<sup>317</sup>, *Ex. P-1098 (Fish Curriculum Vitae)*). He testified that the first step in analyzing sonar data is to detect a target. (*Id. Fish, Day 6, at 21:9-22:18*<sup>318</sup>). CARCO's sonar experts agreed it would be easy to

detect a target the size of the anchor, and it *was* detected on the 2001 scan and the post-casualty scans, *supra*.

The next step is *recognizing* what the target is. (*Id. Fish, Day 6, at 21:9-22:18*<sup>319</sup>). Fish testified that no qualified side scan sonar expert could determine with reasonable certainty what the target was or its orientation or height above the river bed based upon the single 2001 sonar pass, because the sonar was not adjusted sufficiently to pick out such details. (*Id. at 52:12-53:13*<sup>320</sup>, *54:21-25*<sup>321</sup>). Typically, multiple passes are required. (*Id. at 33:9-34:5*<sup>322</sup>).

Specifically, the University's sonar device (sonar "fish") was set at too low a ping rate and moved at too high a speed to get a detailed picture of the anchor. At a rate of one ping per 13 or 14 inches of forward motion, the sonar fish would have passed by the anchor too quickly to pick up an image of the flukes pointing upward. (*Id. at 51:21-52:1*<sup>323</sup>, *53:2-54:5*<sup>324</sup>). The resolution of any image produced from the raw sonar data was just not sufficient to discern the anchor's orientation and height above the river bed. (*Id. 54:6-25*<sup>325</sup>).

CARCO's sonar expert, Traykovski, acknowledged the flukes would not be picked up by direct sonar pings, but opined they would be detected as a result of the spreading of the sonar beam. (*Trial Tr. Day 22, November 4, 2010, Traykovski, at 60:8-61:3*<sup>326</sup>). However, Fish testified the sonar transducer was too close to the target, and the resolution of any resulting image would be insufficient to identify the flukes or their height above the river bed. (*Trial Tr. Day 6, September 29, 2010, Fish, at 52:23-54:25*<sup>327</sup>).

**(b) If the anchor had been horizontal in 2001, it may not reasonably be inferred that its position remained the same for the ensuing three years.**

As testified by the Army Corps of Engineers' Chief of Operations Division in Philadelphia, the Corps and Coast Guard consider that some objects that are deeper than the



project depth of 40' may nevertheless constitute hazards to navigation because they can move.

*(Trial Tr. Day 10, October 6, 2010, DePasquale, at 129:6-16<sup>328</sup>)*. Both sides' sonar experts recognized the anchor may have moved up to 10' or 15' from its location in the 2001 scan.

*(Trial Tr. Day 6, September 29, 2010, Fish, Day 6, at 71:4-13<sup>329</sup>; Trial Tr. Day 22, November 4, 2010 Traykovski, at 24:6-18<sup>330</sup>)*. It is impossible to know how much of that movement occurred in the casualty or during the previous three years.

The post-casualty sonar scans showed marks on the river bottom indicating that anchors and anchor chains were dragged along the bottom. *(Trial Tr. Day 22, November 4, 2010, Traykovski, at 52:1-15<sup>331</sup>)*. The specific marks on the scans were not necessarily at the spot where the anchor was recovered, but they prove the indubitable fact that anchors and anchor chains drag along the bottom of an anchorage. As the culprit anchor had been there for at least three years, marks made at the anchor's location months or years before the casualty would have faded from erosion and sedimentation.

One of those vessels' hulls, anchors, or anchor chains could have contacted the culprit anchor if it were in a prone position. *(Id. at 52:10-15<sup>332</sup>)*. An anchor or anchor chain could have snagged a fluke or knocked against a supposedly upright tripping palm, and jostled the anchor upward to an angle of 30° or more, from which it would continue to rotate upward on its own momentum. *(Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:5-218:15<sup>333</sup>)*. Therefore, the possibility that it was horizontal in 2001 does not justify an inference that it was still horizontal three years later.

Further, although the distance between the palm tips on either side of the anchor was 55", Traykovski opined the allegedly upright palm was only 41" +/- 3.5" above the river bottom, based on its sonar shadow, because the palm on the downward side was partially buried.

Another ship, anchor, or anchor chain could have pushed or pulled the anchor from its buried position, so that the allegedly upright palm reached to its full 55" even if the anchor was prone. (The diver who found the anchor wrote that the river bed was "rock hard" there, *infra*.) That would have left a clearance above the anchor of as little as 36' 8" (based on Traykovski's shallowest depth of "approximately 41'" at MLLW, plus Cole's tide of about .26' above MLLW, minus the anchor's height of 4' 7" between palm tips). Given the necessarily approximate nature of all measures of tidal height (which in this case are calculated backward from soundings taken two and three days after the event), water depth (due to an uneven river bottom) and ships' drafts, it is entirely possible that a ship with a nominal draft of 36' 7" could contact an anchor palm which is at an uppermost depth of *approximately* 36' 8".

However, the nature of the hull damage demonstrates that the anchor's flukes in fact were pointed up and out at an angle of about 65° to the horizontal and a height of about 6 1/2' above the river bed, *infra*. With an average water depth of 41' 5" at MLLW, and an anchor height of 6' 6", the clearance above the anchor would have been only about 34' 11" at MLLW, or 35' 2" at the time and place of the casualty.

Contrary to CARCO's intimation, Bowman did not say the *only* way the anchor could "pop up" would be if another ship knocked it part way down. Issues Br. at 31. He merely responded to a specific question by CARCO's counsel about what would happen if the anchor was already at 65° and struck by a ship. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 115:1-5*<sup>334</sup>). That does not address what would happen if the anchor were lying flat and knocked by a ship's hull or snagged by an anchor or anchor chain, which *was* discussed by Ractliffe. (*Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:5-218:15*<sup>335</sup>).

There is no question that the river bottom was hard enough to support the anchor when it rotated upward. The diver who located the anchor wrote in his report: “Bottom is rock hard with [sic] steel anchor located.” (*Ex. P-1295(r) (Randive Divers Report dated January 5, 2005)*). The word “rock” is floating in this handwritten report, but appears to be interlineated before “hard.”

Additionally, the river bottom was hard enough to support the anchor’s resistance to the ship’s hull and exert an enormous amount of counter-pressure to drive the anchor into the 3/4” steel plating. (*Trial Tr. Day 8, October 4, 2010, Aviram, at 118:22-119:11<sup>336</sup>, 132:2-20<sup>337</sup>; Trial Tr. Day 12, October 12, 2010, Bowman, at 51:20-24<sup>338</sup>, 136:18-137:8<sup>339</sup>*). The anchor withstood the ship’s pressure and pressed back, rather than being pushed vertically into or horizontally through any soft river bottom.

**(c) The particular damage to the ship’s hull can only have been caused by striking a fluke first, with the anchor at an angle of about 65°, and about 6’ 6” above the river bed.**

Early in the investigation, no one knew of the existence of the culprit anchor, and it was a puzzle how *two* holes could have occurred in such proximity on the hull. (*Trial Tr. Day 11, October 7, 2010, Bowman, Day 11, at 111:7-112:16<sup>340</sup>*). Side scan sonar surveys of the river bottom were conducted, which showed three significant targets. (*Trial Tr. Day 6, September 29, 2010, Fish, at 30:16-31:22<sup>341</sup>, 36:6-37:25<sup>342</sup>, 47:15-21<sup>343</sup>; Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25<sup>344</sup>*). Side scan sonar will detect targets, and, if adjusted for the purpose, can detect their size and height above the river bed, but will not necessarily recognize what they are. (*Trial Tr. Day 6, September 29, 2010, Fish, at 21:9-22:18<sup>345</sup>; Trial Tr. Day 22, November 4, 2010, Traykovski, Day 22, at 56:10-17<sup>346</sup>*).

On December 4, 2004, divers searched for and found the first of these targets, which turned out to be a pump-casing. (*Exs. P-1295(h) and (j) (Randive Divers Reports dated*

*December 4 and 5, 2004*)). This object was initially thought to be the culprit, and the Coast Guard held a press conference so announcing. Issues Brief, at 71. Because it was thought that the culprit had been discovered, divers were not sent down to find the other two sonar targets until January 4 and 5, 2005. On January 4, a diver dived on and found the second sonar target, which turned out to be a concrete block. (*Ex. P-1295(r) (Randive Divers Report dated January 4, 2005)*). On January 5, a diver dived on and found the third sonar target, which turned out to be the anchor. (*Ex. P-1295(s) (Randive Divers Report dated January 5, 2005)*).

The anchor's fluke and palm matched the holes in ATHOS I's hull. Both sides' experts agree the long, jagged hole in the no. 7 port side ballast tank was made by one of the anchor's flukes, and the round hole in the no. 7 center cargo tank was made by one of the tripping palms.

The tip of the fluke caused a tell-tale gouge on the hull at the no. 7 port ballast tank. The score mark occurred as the hull scraped along the tip of the fluke, As the ship continued to move astern and to port in contact with the fluke, the steel bottom plating was deflected around the tip of the fluke. As the fluke tip came up against a longitudinal bulkhead and transverse stiffener, the resistance increased until the fluke penetrated the hull. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 105:19-106:19*<sup>347</sup>, *109:22-111:6*<sup>348</sup>; *118:14-119:17*<sup>349</sup>; *124:6-125:16*<sup>350</sup>; *Trial Tr. Day, 12, Bowman, at 136:18-141:9*<sup>351</sup>, *139:19-140:6*<sup>352</sup>; *Trial Tr. Day 32, October 30, 2010, Ractliffe, at 104:20-108:20*<sup>353</sup>).

At the no. 7 center cargo tank, there were no gouge marks on the hull in the vicinity of the round hole, which proves the hull did not scrape horizontally along the anchor palm, as it did along the fluke. Further, the metal of the round hole was sheared, not torn. Therefore, this hole necessarily was caused by the palm punching directly into the hull, like an uppercut or a can opener. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 115:11-24*<sup>354</sup>; *122:10-123:8*<sup>355</sup>; *Trial*

*Tr. Day 12, October 12, 2010, Bowman, at 25:8-17<sup>356</sup>; Trial Tr. Day 9, October 5, 2010, Crosson, at 131:5-19<sup>357</sup>)*

The ship was not bouncing up and down as she moved through the water, and she could not have sat down onto the palm. Rather, the palm came up to punch a hole in the hull. The only way that could happen was for the anchor to lever or rotate upward as the ship moved along with the fluke captured inside the torn hull plating. (*Trial Tr. Day 11, October 7, 2010, Bowman,, at 122:10-123:8<sup>358</sup>*).

Therefore, the fluke was struck first. That could not happen if the flukes were flat on the river bed. It could only happen if they pointed up and out, at an angle of about 65° to the river bed, and a height of about 6' 6" above the river bottom. (*Trial Tr. Day 11, October 7, 2010, Bowman, at 119:5-17<sup>359</sup>, 125:25-127:3<sup>360</sup>; Trial Tr. Day 12, October 12, 2010, Bowman, at 22:3-23:9<sup>361</sup>; Trial Tr. Day 9, October 5, 2010, Crosson, at 109:19-110:5<sup>362</sup>*). According to Dr. Aviram, the fluke first scenario is the *only* feasible way the observed damages could have occurred. (*Trial Tr. Day 8, October 4, 2010, Aviram, at 98:2-5<sup>363</sup>, 132:22-24<sup>364</sup>; Trial Tr. Day 9, October 5, 2010, Aviram, at 7:4-16<sup>365</sup>*).

CARCO's palm-first theory is impossible. First, as noted, the absence of any gouge marks leading into the round hole in the no. 7 center tank and the fact that the hole is not torn, but sheared, means either the ship slammed down onto the palm, or the palm slammed up into the ship. On its face, it was impossible for the ship to slam down vertically onto the palm.

Further, if a palm was captured in the round hole, the anchor would have been pinned in place and the hull would not have moved horizontally against the fluke to cause the long score mark leading up to the ragged tear in the no. 7 port tank.

At the same time, CARCO's theory requires the ship to perform a horizontal jitterbug, which is impossible for a 64,000 deadweight ton vessel. CARCO's theory would have the ship moving to port and astern as she was being pushed by tugs on her starboard side and running her engines astern, and then reversing direction and moving to starboard and forward at the moment she supposedly contacted the protruding anchor palm, and finally stopping her starboard momentum and moving forward and to port; all in a span of 10 seconds. (*Trial Tr. Day, 23, Langford, Day 23, November 8, 2010, at 55:18-58:4*<sup>366</sup>). As a matter of basic physics, an object the size and mass of ATHOS I cannot change direction so radically in such a short period of time. (*Trial Tr. Day 12, October 12, 2010, Bowman, at 136:5-7*<sup>367</sup>). There were no forces applied to the ship at that time that could move her in this jittery manner, while being pushed by tugs toward the berth. (*Trial Tr. Day 32, November 30, 2010, Ractliffe, at 70:17-77:14*<sup>368</sup>); *Ex. P-936 (Figure 1, Overlay of Simulated Movement on Claimed GPS Track)*; *Ex. P-937 (Table 1, Forces Required to Follow Claimed GPS Track)*).

CARCO's theory is contradicted by Docking Pilot Bethel and Frescati's expert witnesses, who all attest that the ship was moving steadily to port and astern (reverse) to line up parallel to CARCO's pier, as reflected by the Engine Bell Book, the GPS, and the nature of the hull damage. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 16:25-17:13*<sup>369</sup>; *Trial Tr. Day 11, October 7, 2010, Bowman, at 133:23-134:4*<sup>370</sup>; *Trial Tr. Day 12, October 12, 2010, Bowman, at 29:1-31:2*<sup>371</sup>; *Trial Tr. Day 7, September 30, 2010, Crosson, Day 7, at 20:25-22:4*<sup>372</sup>).

Importantly, if the ship's hull were as close to the river bottom as CARCO contends, there would not have been enough clearance above the anchor to lift it off the river bed and then drop it free. Rather, the anchor would have been trapped beneath the ship, and would either have been pushed or dragged along, or else trapped in place. CARCO's sonar expert, Traykovski,

reported that the absence of a drag mark on the river bottom west of the anchor proves the anchor was not pushed or dragged along, but was either lifted up and then dropped, or else trapped in place. However, if the anchor was trapped in place and there was no clearance above the anchor palm, it would have damaged the surface of the hull near the round hole as the ship scraped over it after it exited the hull. But there was no such damage.

Even CARCO's expert witness recognized that with so little clearance of water between a prone anchor and the ship's bottom, the anchor would have to have fallen into a hole to avoid a series of perforations to the ship's hull. (*Trial Tr. Day 23, November 8, 2010, Langford, at 82:20-83:6*<sup>373</sup>). But the anchor was not in a hole when it was located on the post-casualty scans and found by the diver. (*Trial Tr. Day 22, November 4, 2010, Traykovski, at 12:1-9*<sup>374</sup>; *Trial Tr. Day 33, Ross, at 10:21-11:1*<sup>375</sup>).

**E. CARCO's negligence, as a wharfinger, caused the casualty.**

The Third Circuit held that, in addition to its safe port warranty as sub-charterer, CARCO owed its invited vessels a common law duty, as the terminal owner, to ascertain the safety of its berth and the approach, and, cites to *Smith v. Burnett*, which explains that the duty requires the wharfinger to warn of dangerous obstructions found there or to remove them. *In re Frescati Shipping Co.*, 718 F.3d at 207, quoting *Smith v. Burnett*, 173 U.S. 430, 433, 436 (1899). However, the court need pursue the issue of wharfinger negligence only if it finds there was no breach of the warranty, or cannot ascertain whether there was a breach. In the event of such a finding, CARCO's negligence can still have been a cause of the casualty if the clearance above the anchor was less than 37' 6" (*i.e.* the safe draft at the start of flood current) plus, we submit, a safety margin.

The Third Circuit held CARCO, as terminal-owner, had an obligation to exercise reasonable diligence to provide a safe berth and approach, applying the Supreme Court's pronouncement that "A wharfinger . . . is bound to use reasonable diligence in ascertaining whether the berths themselves and the approaches to them are in an ordinary condition of safety." *In re Frescati Shipping Co.*, 718 F.3d at 207, 211. The Supreme Court decision cited by the Third Circuit explains what the duty entails. Having found a duty, the next question is did CARCO satisfy that duty by exercising the standard of care required of a reasonable wharfinger under the circumstances. "The nature and extent of the duty of due care is a question of law" but factual issues predominate here. In other words, did CARCO exercise the degree of care required to guard against injury according to the circumstances of this case?

We submit that the required degree of care was very high due to the real probability of injury and the catastrophic monetary and ecological costs of such an injury, while the burden of meeting that standard was very low, merely requiring annual side-scan surveys in the 2,000' x 1,000' pathway from the up-river channel to CARCO's berth, at a minimal cost. CARCO *never* inspected its berth or the approach for hazards, and so did not satisfy *any* standard of care.

We agree with CARCO's statement that the responsibility for a loss equitably falls on the party who was best situated to avoid the injury. Issues Br. at 154, *et seq.* That party was CARCO, who needed only to inspect a finite pathway at a minimal cost to prevent a foreseeable injury. It did not fall upon the Government, who lacked the mandate and resources to inspect 500,000 square miles of navigationally significant waterways throughout the nation. It did not fall upon ship-owners, who could not be expected to inspect the approach to every terminal to which charterers might send their ships over the course of every ship's life. Conversely, a terminal would not want to be inspected by every ship it invited there.



**1. The required standard of care was high.**

What level of care is reasonable always depends on the circumstances. *Grand Trunk R.R. Co. v. Richardson*, 91 U.S. 454, 469-70 (1875); *Guardian Life Ins. Co. of Am. v. Weisman*, 223 F.3d 229, 234 (3d Cir. 2000); *Rodriguez v. Brunswick Corp.*, 364 F. 2d 282, 285 (3d Cir. 1966); *Tokio Marine Mgmt. Inc. v. M/V Zim Tokyo*, No. 91 Civ. 0063 (BN), 1995 WL 347747, at \*7-10 (S.D.N.Y. June 8, 1995).

It is quite a simple question: under the circumstances here, the terminal operator was inviting laden oil tankers with drafts of up to 37.5 feet to cross its approach (“driveway”) at potentially very low stages of tide. What should that wharfinger have done to inspect the riverbed conditions to make sure there were no potential hazards to navigation lurking there? The answer to this question is equally simple – the terminal operator must inspect the approaches on a regular basis using side scan sonar.

The appropriate standard of care has been refined in maritime cases. “The degree of care demanded of a person by an occasion is the resultant of three factors: the likelihood that his conduct will injure others, taken with the seriousness of the injury if it happens, and balanced against the interest which he must sacrifice to avoid the risk.” *Conway v. O’Brien*, 111 F. 2d 611, 612 (2d Cir. 1940), *rev’d on other grounds*, 312 U.S. 492 (1941); *Agni v. Wenshall (In re City of New York)*, 522 F. 3d 279, 284 (2d Cir. 2008); *Brotherhood Shipping Co. v. St. Paul Fire & Marine Ins. Co.*, 985 F. 2d 323, 327 (7th Cir. 1993); *In re Paducah Towing Co.*, 692 F. 2d 412, 422 n. 18 (6th Cir. 1982); *United States Fidelity & Guaranty Co. v. Jadranska Slobodna Plovidba*, 683 F. 2d 1022, 1026 (7th Cir. 1982); *United States v. Carroll Towing Co. Inc.*, 159 F. 2d 169, 173 (2d Cir. 1947).

By analogy to the seminal case concerning when a duty is established, in *United States. v. Carroll*, Judge Learned Hand posited an algebraic equation to illustrate this balancing test. A defendant is negligent if the burden of precaution is less than the probability of injury multiplied by the magnitude of damages. The Third Circuit approved this formula in *Guardian Life Ins.*, 223 F. 3d at 234. Of course, the duty of the wharfinger under *Smith v. Burnett* is the law of the case here.

Here, the risk and need for care were always high, and were heightened further in 1999, when CARCO persuaded the Pilots to open the berthing window four hours earlier than before, reducing the underkeel clearance by four feet. Yet, CARCO *never* inspected either its immediate berth area (which it unilaterally described as its “area of responsibility,” *In re Frescati Shipping Co.*, 718 F.3d 184, 194 (3d Cir. 2011), or the approach to its berth, for submerged hazards. *Id.*; (*Trial Tr. Day 10, October 6, 2010, Drager*, at 85:23-86:1<sup>376</sup>; *Rankine Dep, October 16, 2007, at 148:8-18*<sup>377</sup>, 162:3-10,<sup>378</sup> 172:12-173:15,<sup>379</sup> 193:20-24,<sup>380</sup>; *Kamat Dep. dated February 29, 2008, at 101:23-102:9*<sup>381</sup>, 120:14-122:3,<sup>382</sup>; *Trial Tr. Day 28, November 17, 2010, Long, at 109:11-13*<sup>383</sup>). Doing nothing cannot, as a matter of law, satisfy any standard of care the Court holds was necessary under the circumstance of this case.

## **2. Why didn’t CARCO inspect the approach to its berth for potential obstructions to navigation?**

Although CARCO was the wharfinger, it relied on the Tulsa (later Houston) based CITGO Petroleum for all marine-related safety matters. (*Trial Tr. Day 10, October 6, 2010, Drager*, at 43:22-44:17<sup>384</sup>). CITGO Petroleum, however, effectively had no marine-related safety program. It had a corporate Health, Safety and Environmental Department, but this department concentrated on shore-side regulatory compliance. It lacked marine expertise and gave no consideration to marine issues. Ultimately, it relied on one employee on site in

Paulsboro, the Port Captain, to see to the safety of its marine terminal there. (*Trial Tr. Day 10, October 6, 2010, Drager, at 27:5-9*<sup>385</sup>, *29:24-30:4*<sup>386</sup>, *43:22-44:17*<sup>387</sup>, *49:6-9*<sup>388</sup>; *DeVelasco Dep., August 20, 2010, at 15:9-12*<sup>389</sup> *18:12-19:15*<sup>390</sup>, *34:20-36:14*<sup>391</sup> *39:8-40:11*<sup>392</sup>). Neither the Health, Safety and Environmental Department, nor CARCO's guidelines for its Port Captains, called for any surveys for obstructions at CARCO's facilities. (*Trial Tr. Day 30, November 22, 2010, Rankine, at 52:12-53:1*<sup>393</sup>; *Rankine Dep., October 16, 2007, at 172:23-174:5*<sup>394</sup>; *Exh. P-4 (CITGO Marine Operations Guidelines)*).

Of particular importance is the failure by CARCO and its Port Captain in 1999, Ranjit Kamat, to conduct any sort of risk assessment when CARCO persuaded the Docking Pilots Association to berth tankers four hours earlier than before, thereby reducing under-keel clearance by four feet and substantially increasing the risk of striking submerged objects. (*Trial Tr. Day 13, October 13, 2010, Brooking, at 47:3-10*<sup>395</sup>).

CARCO's Port Captain at the time of the casualty, William Rankine, claimed he relied upon his *depth* surveyor, ST Hudson Engineers, to tell him if they found an obstruction. However, Hudson was never hired to do a survey for obstructions, only for depth, which does not find obstructions, and only in CARCO's self-delimited so-called "area of responsibility." Moreover, Hudson was not even asked to analyze its single beam sonar data, but passed it directly to Rankine. (*Rankine, Dep. dated October 16, 2007, at 145:3-146:4*<sup>396</sup>; *Rankine Dep. dated October 17, 2007, at 25:25-26:14*<sup>397</sup>; *Trial Tr. Day 28, November 17, 2010, Long at 79:3-14*<sup>398</sup>).

The fact is that neither Rankine, nor his predecessor, Kamat, had any knowledge regarding surveys for obstructions and were never provided with any training by CARCO, notwithstanding that they were in charge of marine safety at their terminal. (*Trial Tr. Day 30,*

*November 22, 2010, Rankine, at 9:21-24<sup>399</sup>, 10:9-11<sup>400</sup>, 86:15-88:7<sup>401</sup>; Rankine Dep., October 16, 2007, at 41:17-42:9<sup>402</sup>, 43:7-12<sup>403</sup>, 56:11-23<sup>404</sup>, 75:3-23<sup>405</sup>, 76:13-20<sup>406</sup>, 116:1-7<sup>407</sup>, 116:21-117:6<sup>408</sup>; Kamat Dep. dated February 29, 2008, at 44:16-24<sup>409</sup>, 45:18-46:5<sup>410</sup>, 46:24-47:12<sup>411</sup>, 120:14-121:6<sup>412</sup>, 167:9-18<sup>413</sup>; Trial Tr. Day 10, October 6, 2010, Drager, at 27:5-9<sup>414</sup>).*

CARCO was happy to retain the through-put advantage it gained and the demurrage charges it saved, and should have borne the minimal cost of the precaution its requested change made more imperative than ever.

### **3. The Cost of Ignoring the Risks vs. The Costs of Inspecting**

The foreseeable magnitude of the potential harm from an oil spill was catastrophic, both in dollar damages and immeasurable environmental impact. The cost of inspection was small, as little as \$7,500.

Frescati's expert, who conducted side scan sonar inspections for a living, estimated the cost of inspecting the approach at about \$7,500 to \$11,000. (*Trial Tr. Day 6, September 29, 2010, Capone, at 140:22-143:22<sup>415</sup>*). CARCO's depth surveyor, Richard Long, who would have had to subcontract out for a side scan sonar inspection, thought the cost might be \$25,000 to \$30,000. (*Trial Tr. Day 28, November 17, 2010, Long, at 121:12-19<sup>416</sup>, 123:8-24<sup>417</sup>*).<sup>13</sup> (A depth survey cannot detect submerged obstacles. *In re Frescati Shipping Co.*, 718 F.3d at 194.) Either way, the cost was much less than a single day's demurrage on a ship such as ATHOS I, which was \$42,000, and a tiny fraction of CARCO's annual \$250 million in revenues. (*Trial Tr. Day 10, October 6, 2010, Drager, at 58:12-14<sup>418</sup>*). It was also a tiny fraction of the foreseeable

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<sup>13</sup> If a significant target were found, it would have cost another \$6,000-\$7,000 to send a diver down to investigate further. (*Trial Tr. Day 28, November 17, 2010, Long, Day 28, at 137:22-25*). Obviously, if such a target were found, further investigation would be imperative, and would have been done by the Government if CARCO would not do it. (*Trial Tr. Day 10, October 6, 2010, DePasquale, at 99:3-19*).

catastrophic damages in any oil spill case, here \$143 million, not to mention the environmental impact. As to the foreseeable prospect of injury, CARCO's Port Captain, William Rankine, his predecessor, Ranjit Kamat, and Marine Technical Services Manager, Robert Williams, all acknowledged that the Delaware River bottom, including in the anchorages, is known locally to be scattered with potentially hazardous debris, *including, specifically, lost anchors*. (*Rankine Dep*, Oct. 16, 2007, at 248:23-249:12<sup>419</sup>; *Kamat Dep*, Feb. 29, 2008, at 124:24-126:12<sup>420</sup>; *Williams Dep*, Jan. 16, 2008, at 139:9-12; 140:6-9, 12-14<sup>421</sup>).

CARCO invokes the warning on NOAA's charts that charts do not show all sea bed obstructions. Issues Br. at p. 76, n.18. CARCO's marine safety officers, Rankine and Kamat, were no less on the same notice, and thus on notice that they should inspect the approach.

Similarly, 49 C.F.R. § 1.46 (c) warns: “. . . In establishing an anchorage, the Coast Guard does not guarantee that the anchorage is clear of sunken uncharted obstructions . . . ,” thus providing CARCO additional notice it should have exercised reasonable care to determine whether there were any such obstructions in the approach to its berth through the anchorage.

**F. The essential purpose of the *Smith v. Burnett* duty is to compel the terminal operator to take reasonable steps to find out what might be lurking in the normal approach to its berth..**

In the face of the foregoing testimony, the fact that other ships safely docked at CARCO's terminal does not make an allusion with a submerged object unforeseeable, nor does it excuse CARCO's inaction. In fact, CARCO admitted it knew of the potential of hazardous debris. But its duty did not depend on the foreseeability of the specific hazard ultimately found. The essential purpose of the *Smith v. Burnett* duty is to compel the terminal operator to take reasonable steps to find out what might be lurking in the normal approach to its berth. It doesn't matter whether the hazard to navigation was a rock that had been there forever, a pipe-casing, or

an unforeseen anchor. CARCO's duty was to ascertain whether its approach was safe from hazards that might be scattered on the bottom of the Delaware River.

Potential injury from such expectable hazards did not gradually become unforeseeable because no previous ship was damaged. A duty either existed or did not exist. Following *Smith v. Burnett*, the Third Circuit has underscored it existed. It was not mitigated by the passage of time or the docking of other ships. Time did not erase CARCO's duty or its admitted knowledge of the potential of hazardous debris.

If the anchor did not injure another ship, that proof would not relieve CARCO of its duty to take reasonable steps to properly examine its approaches for hazards.. *The Gazelle v. Brun*, 128 U.S. 474, 485 (1888). In *Merritt v. Sprague*, 191 F. 627, 630 (D. Me. 1911), the court noted that evidence that other vessels used a dock safely:

is valuable to show that under some circumstances the dock could be used without occasioning injury to vessels using it; but that such evidence is not of great probative value when it is proved that such defects could have been readily discovered and remedied by proper examination.

As stated in *Gill v. Hango Ship-Owners/AB*, 682 F.2d 1070, 1074 (4th Cir. 1982), "an accident that is unprecedented or extraordinary is not necessarily unforeseeable." *Id.* (citing *Kunz v. Utah Power & Light Co.*, 526 F.2d 500, 504 (9th Cir. 1975)).

In *Smith v. Havenmeyer*, 36 F. 927 (C.C.S.D.N.Y. 1888), a ship became hung up on a ledge at the pier's foundation, which had never happened in the ten years similar vessels used it. Nevertheless,

It was not necessary for the libellant to show that the appellants were aware of the vices and defects in the structure which occasioned the injury to the vessel. It suffices to charge the appellants with negligence that they could have discovered it if they had exercised proper care to inform themselves of the condition of the structure.

36 F. at 927-28.

As aptly stated in *Tokio Marine Mgmt.*, 1995 WL 347747, at \*9:

The question of foreseeability may not be conclusively resolved by measuring the frequency of harm; if the risk is more than merely conceivable (even if mathematically slight) and the gravity of the potential harm is of sufficient magnitude, the law will still place upon defendants a duty to provide against the contingency.

The Second Circuit stated in *Pease v. Sinclair Ref. Co.*, 104 F.2d 183, 186 (2d Cir. 1939) (quoting *Tullgren v. Amoskeag Mfg. Co.*, 133 A. 4, 8 (N.H. 1926)):

it is not necessary that damage as a more rather than less probable result should be anticipated. \* \* \* Danger consists in the risk of harm, as well as the likelihood of it, and a danger calling for anticipation need not be of more probable occurrence than less. If there is some probability of harm sufficiently serious that ordinary men would take precautions to avoid it, then failure so to do is negligence. \* \* \* the test is not of the balance of probabilities, but of the existence of some probability of sufficient moment to induce action to avoid it on the part of a reasonable mind.

CARCO's *Smith v. Burnett* duty to inspect its approach exists because the risk of injury from obstructions is "more than merely conceivable," *Tokio Marine Mgmt.*, 1995 WL 347747, at \*9. There most certainly was "some probability of sufficient moment to induce action to avoid it . . ." *Pease*, 104 F.2d at 186.

**G. That Other Ships made the Approach to the CARCO Berth Without *Reporting* any Damages is Irrelevant and Does Not Excuse CARCO From Its Duty to inspect under *Smith v. Burnett*.**

CARCO grossly exaggerates the number of ships that supposedly passed over the anchor. The anchorage was 2.2 miles long, *In re Frescati Shipping Co.*, 718 F.3d at 194, and most of the hundreds of ships that used it did not cross the narrow pathway at the southern tip from the channel to CARCO's berth, or go anywhere near where the anchor sat, contrary to CARCO's unsupported assertion that "hundreds of vessels passed over the spot where the anchor was found." Issues Br. at 31.

Only 71 ships with drafts over 36' 6" berthed at CARCO since the August 2001 University survey in which the anchor appeared, and therefore *may* have crossed over the anchor.

*In re Frescati Shipping Co.*, 718 F.3d at 203-04; Ex. D-1137. (The Third Circuit inadvertently said it was 61 ships. *In re Frescati Shipping Co.*, 718 F.3d at 195.) ATHOS I was holed in her aft-most tanks, slightly forward of where the stern of the ship curves upward. Other ships may have crossed the anchorage a few feet more to the south, while still in the same path of approach as ATHOS I, and missed the anchor by sheer luck, or may have been moving forward, or hit the anchor at a different angle causing only scraping damage that was not felt at the time (and not known until the ship's next dry docking, when the source would be undeterminable).

Some 22 of the aforesaid 71 ships necessarily berthed at higher tide than ATHOS I because their drafts exceeded 37' 6" and made a later berthing window applicable. 718 F. 3d at 195; (*Ex. D-1137 (Historical Vessel Calls at CARCO -1997-2005)*). Another 31 of those ships had drafts between 37' and 37' 6", and likely docked at higher tide because a MAC Advisory recommended that ships over 37' transit the up-river channel on flood tide. (*Ex. D-1272, ¶2 (Transit Advisory)*). There is no such restriction for Panamax size ships with shallower drafts, like ATHOS I.

Vessels prior to August 1999 with drafts exceeding 36' 6", cited by CARCO, Issues Br. at 9, are irrelevant (whether or not the anchor was already there) because before that date the Docking Pilots Association would only dock vessels with drafts in excess of 36' at higher tide.

Vessels that *loaded* at CARCO's terminal to deeper drafts than ATHOS I, *id.*, are irrelevant because those ships were moving away from the terminal in the opposite direction of ATHOS I, in which case, if they crossed the anchor, they would have been moving in the opposite direction. There is no showing they departed on the identical pathway of ships approaching the terminal, were governed by the same guidelines, passed over the anchor, or did so at the same stage of tide as ATHOS I.



Further, it is possible that other ships contacted the anchor at an angle that did not cause damage, and no one knew it, just as those on ATHOS I's bridge felt and heard nothing until the ship listed after river water rushed in. Contrary to CARCO's assertion, Br. at 10, Docking Pilot Bethel did not say that none of his previous ships contacted the anchor. To the contrary, he said they might well have done so. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 19:13-17*<sup>422</sup>, 55:25-56:6<sup>423</sup>; *Trial Tr. Day 11, October 7, 2010, Bowman, at 134:20-135:9*<sup>424</sup>, *Trial Tr. Day 12, October 12, 2010, Bowman, at 112:23-113:24*<sup>425</sup>).

**H. A reasonably prudent wharfinger inviting deep draft laden oil tankers to its terminal at low stages of the tide would have ensured the approaches to its berth were surveyed regularly for potential hazards to navigation.**

The only way of "ascertaining whether the berths themselves and the approaches to them are in an ordinary condition of safety" is to inspect them. The plain meaning of the term "ascertain" can be found in Webster's Third New Int'l Dictionary 79 (1993) (p. 126): "to find out or learn for a certainty (as by examination or investigation): make sure of." The berth and the approach should have been inspected by side scan sonar regularly after CARCO acquired the facility in 1991, at the same time of year CARCO's depth surveyor conducted annual depth soundings in its self-declared "area of responsibility." Additional side scan inspections might be required if called for by particular circumstances, such as vessel reports of lost anchors, or changes in the berthing procedures as in 1999 when CARCO sought a change in the window for bringing deep draft tankers to its berth. CARCO gave an example of such a circumstance when it cited an instance in which a ship exploded and sent debris across the river, which prompted the Army Corps of Engineers to inspect the anchorage. Issues Br. at 142. As confirmed by CARCO's own expert witness, who was a former Army Corps of Engineers Branch Chief, the Government does not routinely conduct inspections for debris unless it is notified of potential

hazards or is asked to inspect. (*Barnes, Dep. dated August 12, 2009, at 63:8-21*<sup>426</sup>, 67:13-68:11<sup>427</sup>); *In re Frescati Shipping Co.*, 718 F.3d at 194.

The geographic borders of the inspection were finite, comprising 2,000' from the up-river channel to CARCO's pier, by 1,000' width that the vessel needed to make her 180° turn and be pushed across the anchorage. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 27:4-15*<sup>428</sup>, 28:4-18<sup>429</sup>). The Third Circuit noted that this case was "not one of the difficult ones" in which to know the approach, given the unanimous testimony from both sides' witnesses. *In re Frescati Shipping Co.*, 718 F.3d at 209.

The cost of a side scan sonar inspection was small, at \$7,500 to \$30,000, *supra*.

As CARCO's expert agreed, side-scan sonar surveys are typically used to inspect for obstructions. (*Trial Tr. Day 21, November 3, 2010, Cole, at 121:19-23*<sup>430</sup>). As all the sonar experts agreed, it would be *easy* to detect a target the size of the anchor by side scan sonar, *supra*. It was detected in the 2001 University of Delaware side scan survey and all the post-casualty surveys.

#### **I. CARCO's failure to inspect the approach was a proximate cause of the casualty.**

Frescati has shown that the ship's draft on arrival at Paulsboro was 36' 7" and there was no possibility that any ingress of ballast water changed that fact. CARCO's own theories would not put the ship's draft as deep as the maximum safe draft of 37' 6" at the start of flood current. Under any theory, the anchor's height impinged on the safe draft of any ship approaching at the start of the flood current with a draft up to 37' 6", and was the direct cause of the casualty.

CARCO is wrong in arguing its failure to inspect was not causal because an inspection of the approach would not have found the anchor, based on the inexcusably misleading assertion that it took the post-casualty investigators 40 days of "active searching" to find it. Issues Br. at

153, 170. First of all, it wasn't necessary to "find" the anchor, only to detect it on a side scan sonogram, which is linked to GPS, and report it to the Government and CARCO's invited vessels. More importantly, as previously discussed, it did not take 40 days to find the anchor. No divers were sent to look for the second and third side scan sonar targets until January 4 and 5, 2005, because it was believed the culprit was a pump-casing that was found at the beginning of the investigation, on the first dive onto one of the three sonar targets on December 4, 2004. The divers did not look for any of the three sonar targets before December 4th, because they were previously examining the ship's hull and marks on the river bed. (*Exs. P-1295(a)-(g) (Randive Divers Reports)*). Dive time was limited to about two hours each day, during the slack currents before the tides turned. (*Trial Tr. Day 33, December 1, 2010, Ross, at 9:13-23*<sup>431</sup>).

When the divers looked for the third sonar target on January 5, 2005, the anchor was found within 42 minutes, because that was the entire duration of the dive (08:30 to 09:12). (*Ex. P-1295(s) (Randive Divers Report dated January 5, 2005)*). Further, the \$100,000 costs to which CARCO refers, Issues Br. at 170, were not incurred in the search for the anchor, but in the sonar expert's role in the entire investigation of the casualty.

Similarly incorrect is CARCO's statement that the 15' long pump-casing was not detected on the sonar scans, but was discovered accidentally when a diver bumped into it. Issues Br. at 171. The pump casing certainly *was* detected as one of the three significant targets on the sonar scans. (*Trial Tr. Day 6, September 29, 2010, Fish, 30:16-31:22*<sup>432</sup>, *36:6-37:25*<sup>433</sup>, *47:15-21*<sup>434</sup>; *Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25*<sup>435</sup>). That is why a diver was sent down to look for it on December 4, 2004. (*Trial Tr. Day 6, September 29, 2010, Fish, at 85:22-25*<sup>436</sup>). He started to search a 50' area, but had to call it off due to a strong tidal current. As he

retraced his steps, following his umbilical, he bumped into the pump-casing right where the sonar scan said it was. (*Ex. P-1295(h) (Randive Divers Report dated December 4, 2004)*).

In fact, the presence of three significant obstructions, such as a 15' long pump-casing and an 8' long concrete block within 200 feet of an 8' long anchor, and all within roughly 1,000' of CARCO's berth, underscores the seriousness of CARCO's failure to take any steps whatsoever to ascertain whether there were any submerged hazards in the approach to its berth. (*Trial Tr. Day 6, September 29, 2010, Fish, 30:16-31:22<sup>437</sup>, 36:6-37:25<sup>438</sup>, 47:15-21<sup>439</sup>; Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25<sup>440</sup>; Ex. P-1153 (Aerial Photograph with vessel and obstructions superimposed); Exs. P-1295 (h), (j), (r), and (s) (Randive Divers Reports dated December 4 and 5, 2004 and January 4 and 5, 2005)*).

CARCO is extraordinarily wrong in arguing its failure to inspect was not causal because "side-scan sonar does not indicate the depth of an object and therefore does not provide information about whether or not it poses a danger to navigation." Issues Br. at 171. The very purpose of a sonar inspection is to determine whether there is a target that represents a *potential* hazard to navigation. A target's position is fixed by GPS linked to side scan sonar. Its depth can be determined simply by referring to a navigation chart or the Army Corps of Engineers sounding charts that are available to the public. (*Trial Tr. Day 10, October 6, 2010, DePasquale, 119:23-120:2<sup>441</sup>*). A target's height above the river bed need not necessarily be known to know it is a potential hazard. Nevertheless, both sonar experts agreed a target's height above the river bed can be determined from a sonar scan conducted for that purpose, such as the post-casualty scans. (The 2001 University scan was not designed for that purpose.) As previously discussed, even in a flukes-down position, the anchor palm, at a shallowest depth of 37' 5.5" (per Traykovski's analysis), encroached on the space of a ship with a safe draft of 37' 6".

Even at the deepest MLLW depth of 37.8' calculated by Traykovski (*Trial Tr. Day 22, November 4, 2010, Traykovski, at 50:17-51:3*<sup>442</sup>), plus 0.26' for Cole's calculated tidal height ( $37.8' + 0.26' = 38.06'$ ), the anchor would have impinged on the safety margin recommended for a 37' 6" draft ship. At 5% of draft, the safety margin for a 37' 6" draft ship would be 1' 10.5". Therefore, a clearance of 39' 4.5" would have been necessary before CARCO could even begin to argue that a prone anchor was not a potential hazard that it should have found and reported.

Stated more simply, any object that protruded above the 40' project depth should have been found and reported. (*Trial Tr. Day 10, October 6, 2010, DePasquale, Day 10, at 98:12-99:2*<sup>443</sup>). By every account, the uppermost part of the anchor protruded above 40'. Upon detecting such a potential hazard on a scan and reporting it, a further investigation would be conducted by the Government, if CARCO wouldn't do it. The Army Corps of Engineers would remove the object if it was a hazard, or notify the Coast Guard, the Pilots, and mariners. (*Id.*, at *98:15-100:5*<sup>444</sup>).

Detecting a target does not mean knowing what the object is. However, the presence of a significant object is itself a potential hazard that should be reported to a terminal owner's invited vessels, and to the Coast Guard or Army Corps of Engineers, who would investigate, remove the obstruction, or notify ships in its weekly Notices to Mariners and navigation charts. (*Trial Tr. Day 24, November 9, 2010, Barnum, at 3:20-6:21*<sup>445</sup>, *51:16-24*<sup>446</sup>, *54:5-23*<sup>447</sup>; *Trial Tr. Day 10, October 6, 2010, DePasquale, at 98:15-100:5*<sup>448</sup>; *Trial Tr. Day 3, September 22, 2010, Adams, at 63:10-64:15*<sup>449</sup>, *101:21-102:16*<sup>450</sup>). Forewarned, a vessel could await high tide.

# **1. CARCO's excuses for not inspecting are unavailing.**

Given a berth-owner's undoubted duty to exercise reasonable diligence to ascertain the safety of its berth and approach, the burden is on CARCO to show an adequate excuse for not

doing so. *Berwind-White Coal Mining Co. v. City of New York*, 135 F.2d 443, 446 (2d Cir. 1943).

**(a) CARCO was mistaken in allegedly believing it was not permitted to inspect in the federal anchorage and had no legal responsibility to do so.**

At the previous trial, CARCO's excuses for not inspecting the approach were that it was not permitted to inspect in a federal anchorage, and it had no responsibility to do so because the Government controlled the anchorage and supposedly was responsible for ensuring its safety.

*(Trial Tr. Day 30, November 22, 2010, Rankine, at 52:24-53:4<sup>451</sup>, 54:5-24<sup>452</sup>, 87:15-19<sup>453</sup>; Rankine Dep. dated October 16, 2007, at 77:23-25<sup>454</sup>, 82:17-84:2<sup>455</sup>, 173:16-22<sup>456</sup>; Trial Tr. Day 10, October 6, 2010, Drager, at 60:24-61:10<sup>457</sup>).*

The former was a mistake of fact. Nothing prevents a terminal from inspecting in a federal anchorage, and no permit is required to do so. *(Trial Tr. Day 10, October 6, 2010, DePasquale, at 90:18-91:7<sup>458</sup>, 104:16-105:13<sup>459</sup>; Trial Tr. Day 28, November 17, 2010, Long, at 66:14-67:16<sup>460</sup>, 124:15-20<sup>461</sup>; Trial Tr. Day 6, September 29, 2010, Capone, 116:9-22<sup>462</sup>, 141:10-15<sup>463</sup>).* The latter was a mistake of law, now corrected by the Third Circuit.

CARCO could even have asked the Government to survey for obstacles if it thought it was not permitted or responsible to do so itself. *(Trial Tr. Day 24, November 9, 2010, Barnum, at 53:18-54:4<sup>464</sup>).*

**(b) CARCO did not and may not rely on the Government to ascertain the safety of the approach through the anchorage.**

CARCO's current argument that it relied upon the Government to ascertain the safety of the approach through the anchorage is unfounded both as a matter of law and a matter of fact. Issues Br. at 161, *et seq.* The Third Circuit has ruled that the Government has no legal duty to

inspect for submerged hazards and noted Judge Fullam's finding of fact that the Government has not undertaken to do so. *In re Frescati Shipping Co.*, 718 F.3d at 194. CARCO, contradicting its alleged reliance on the Government, acknowledges that the Government does not inspect for obstructions absent notice of a potential hazard. Issues Br. at 170. As a matter of law, one may not justifiably rely upon the Government to do something it has no duty to do and does not do.

CARCO misplaces its reliance on *Japan Line, Ltd. v. United States*, 1976 A.M.C. 355 (E.D. Pa. 1975), *aff'd*, 547 F.2d. 1161 (3d Cir. 1976). Issues Br. at 141, 159, 161. That case, and its entire discussion about the Government's activities, dealt with *depth*, not obstructions. There, the Army Corps of Engineers failed to warn mariners of a shoal in an up-river channel, not an obstruction in an approach to a berth. The "comprehensive system" the court mentioned was for disseminating information, not inspecting for obstacles. 1976 A.M.C. 355 ¶ 63.

In point of fact, CARCO did not rely upon the Government. Rankine and his predecessor admittedly gave it no thought whatsoever. Neither Rankine, Kamat, nor anyone else at CARCO knew what the Government did. (*Kamat Dep. dated February 29, 2008, at 120:14-121:6*<sup>465</sup>; *Trial Tr. Day 30, November 22, 2010, Rankine, at 88:10-14*<sup>466</sup>, *89:16-90:1*<sup>467</sup>; *Rankine Dep. dated October 16, 2007, at 246:24-247:3*<sup>468</sup>, *251:4-8*<sup>469</sup>). They just "didn't pay any attention." (*Trial Tr. Day 30, November 22, 2010, Rankine, at 88:10-14*<sup>470</sup>, *89:16-22*<sup>471</sup>). One may not justifiably rely upon what one does not know and, indeed, *makes no effort to find out*.

Nor did the local harbor safety committee, the MAC, have an expectation that the Government would inspect anchorages for submerged hazards, contrary to CARCO's allegation. Issues Br. at 161. Former Captain of the Port of Philadelphia and MAC member Gregory Adams testified MAC *knew* the Government surveyed only for depth, *not* for obstructions, unless it

received notice of a potential hazard. (*Trial Tr. Day 3, September 23, 2010, Adams, at 63:20-64:12*<sup>472</sup>, *67:11-70:8*<sup>473</sup>, *101:21-103:3*<sup>474</sup>).

CARCO was a member of MAC, as are the relevant government agencies. (*Trial Tr. Day 3, September 23, 2010, Adams, at 67:16-68:14*<sup>475</sup>, *69:10-70:3*<sup>476</sup>; *Trial Tr. Day 10, October 6, 2010, DePasquale, at 106:24-107:14*<sup>477</sup>). CARCO's Port Captain Rankine and his predecessor, Ranjit Kamat, attended the quarterly MAC meetings. (*Trial Tr. Day 30, November 22, 2010, Rankine, at 96:18-20*<sup>478</sup>; *Rankine Dep. dated October 16, 2007, at 206:14-207:13*<sup>479</sup>; *Kamat Dep. dated February 29, 2008, at 196:10-18*<sup>480</sup>, *197:9-19*<sup>481</sup>). Therefore, Kamat and Rankine knew what MAC knew, that the Government did not inspect for submerged obstacles. Certainly, they could have asked about it. Time was set aside at the MAC meetings for questions and dialogue. (*Trial Tr. Day 10, October 6, 2010, DePasquale, at 108:14-23*<sup>482</sup>). Or they could have picked up the telephone and asked.

CARCO argues that if it's too expensive for the Government to inspect for submerged hazards, then it's too expensive for CARCO to do so. Issues Br. at 170. There is, however, a manifest difference between a commercial facility that regularly receives laden tankers having to inspect an approach of finite dimensions at minimal cost, and the Government having to inspect 500,000 square miles of navigationally significant waters across the nation. (*Trial Tr. Day 24, November 9, 2010, Barnum, at 47:10-16*<sup>483</sup>). It was CARCO, not the Government, who wanted deep draft ships to cross the southern tip of the anchorage at a low stage of tide to deliver its oil. And CARCO was on notice that the Coast Guard did not guarantee anchorages were free from uncharted obstructions, by the warnings on navigation charts and the express language of 49 C.F.R. § 1.46, quoted above.



(c) **No custom excused CARCO from its duty to inspect the approach.**

CARCO alleges that no one else inspects the approaches to their berths for submerged hazards, and this amounts to a custom of the trade excusing it from doing so. Issues Br. at 186 *et seq.* The Third Circuit, however, has already held a duty exists. The only relevant custom would pertain to what conduct would satisfy that duty. A group of terminals cannot disregard a Supreme Court mandate altogether and call it a trade custom.

The Third Circuit considered the evidence about any alleged custom was insufficient and subject to remand. *In re Frescati Shipping Co.*, 718 F.3d at 211 n.31. Any alleged custom must be founded on some reasonable factual basis. CARCO has shown no custom and no factual basis for any standard of care entailing less than an annual side scan sonar survey. CARCO's only supposed custom is that "no one does it." Even if the Third Circuit had left the door open to enforce such a so-called custom, there would have to be a valid reason underlying it, such as impracticality, ineffectiveness, or undue expense. There is no such reason in this case. All the experts agree side scan sonar is practicable, effective, and inexpensive compared to what is at stake from a failure to inspect.

Custom does not establish the required standard of care, or excuse negligence. *The Gazelle*, 128 U.S. at 485-86; *In re Tug Ocean Prince, Inc.*, 584 F.2d 1151, 1156 (2d Cir. 1978); *The T. J. Hooper v. N. Barge Corp.*, 60 F.2d 737, 740 (2d Cir. 1932); *Tokio Marine Mgmt.*, 1995 WL 347747, at \*7-10. "What usually is done may be evidence of what ought to be done, but what ought to be done is fixed by a standard of ordinary prudence, whether it usually is complied with or not." *Texas & Pacific Ry. Co. v. Behymer*, 189 U.S. 468, 623 (1903).

Evidence of custom may be considered, but "a possible tortfeasor may not rely solely upon its adherence to industry standards, customs, or practices as a *per se* defense to a negligence claim." *Beretta v. Tug Vivian Roehrig, LLC*, 259 F. App'x 343, 344-45 (2d Cir.

2007). As CARCO has no other valid excuse for ignoring its duty to ascertain the safety of the approach to its berth, it may not rely upon an alleged custom not to inspect.

**J. There was no negligence in voyage planning or violations of statutes or regulations, and no alleged violation could have caused the casualty.**

CARCO's Issues Brief is very long on what the federal regulations require, substantively short on evidence proving there were any violations, and completely silent about how any alleged violations could have caused the casualty if the ship's draft was 36' 7" (or anything up to 37' 6"), in circumstances where the flood current was running and the tide was rising when she entered the anchorage, the water level at that time was only 2.4" below the charted level, and the ship had over 5' of clearance above the river bed at the time and place of the accident. Nevertheless, we are constrained to respond to the allegation that there were violations.

**1. There was no negligence in voyage planning or execution, and the attacks on the Master and both Pilots are unfounded.**

There was no negligence in planning or conducting the up-river voyage, and the fact that the latter part of the up-river trip was on a falling tide is in any event irrelevant because it did not and could not cause the allision. If the ship would arrive off Paulsboro at too low a depth of water to cross the anchorage or too soon before the flood current, she could slow down, or continue up-river and turn around, or wait in place, until the tide rose or the current changed.

Additionally, there was no negligence in planning or executing the approach through the anchorage. As the Third Circuit recognized, there is no indication in the record the ship was "attempting to dock at an inappropriate time." 718 F.3d at n. 22. Further, as CARCO's experts acknowledged, squat had nothing to do with the casualty, and the ship's draft was less than 37' based on the uncontradicted evidence of the weights on board both pre and post incident.

While CARCO devotes much rhetoric to the allegation that the tide was lower than predicted and the actual depth when the ship entered the anchorage was allegedly 2.4” lower than the charted depth, its own tide expert acknowledged this is common and normal. (*Trial Tr. Day 21, November 3, 2010, Cole, at 92:9-93:2*<sup>484</sup>, *96:3-9*<sup>485</sup>; *Trial Tr. Day 6, November 29, 2010, Capone, at 118:15-19*<sup>486</sup>). It is something River Pilots and Docking Pilots deal with routinely. Both Pilots said the tide was normal. (*Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23*<sup>487</sup>, *59:8-11*<sup>488</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-17*<sup>489</sup>, *9:5-20*<sup>490</sup>; *64:22-65:9*<sup>491</sup>, *68:1-6*<sup>492</sup>). There is no basis for CARCO’s gratuitous attacks on the competence of both Pilots.

CARCO’s misstep in attacking the Pilots lies in its own confusion of the words “predicted” and “anticipated.” Predicted tides are contained in tide tables prepared years in advance. (*Trial Tr. Day 21, November 3, 2010, Cole, at 47:1-10*<sup>493</sup>). The tide on November 26, 2004 may have been lower than *predicted*. What the Pilots *anticipated*, however, was based on the real-time conditions they ascertained before going out to the ship. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 46:22-25*<sup>494</sup>); (*Trial Tr. Day 2, September 22, 2010, Teal, Day 2, at 70:11-17*<sup>495</sup>).

**(a) Teal and the up-river voyage.**

As irrelevant as the up-river voyage is to what occurred in the anchorage, we cannot ignore CARCO’s wrongful allegations of Pilot and Master negligence.

CARCO writes that River Pilot Teal did not attempt to find out the actual height of the tide by telephone while he was on the ship, citing (*Trial Tr. Day 2, September 22, 2010, Teal, at 86:12-16*<sup>496</sup>). Issues Br. at 79. However, counsel only asked Teal about the height of the tide at Marcus Hook. Teal answered that the tide gauge at Marcus Hook was inoperative or inaccurate.

(*Id.* at 86:12-16). Nevertheless, before he went out to the ship, Teal “had ascertained the tide predictions and the state of the current and the state of the tide, at the moment . . .” (*Id.* at 70:17-21<sup>497</sup>).

CARCO wrongly claims that Teal “Astonishingly [] did not know that the actual tide height was lower than predicted on the date of the incident.” Issues Br. at 79, citing *Trial Tr. Day 2, September 22, 2010, Teal, at 87:1-4*. In fact, Teal was asked about what he *anticipated*, not what was *predicted*:

Q You know today that the tide, in fact, was lower than you had anticipated at the anchorage, I'm sorry, at Paulsboro, correct?

A. I don't know that, no.

Contrary to CARCO's interpretation, Teal did not say he did not know about the tide. He said he did not agree with counsel's assertion that the tide was lower than he *anticipated*.

That testimony was preceded by a similarly unsuccessful attack about what Teal *anticipated*, at 74:10-18:

Q. So, you anticipated reaching Paulsboro at low water?

A. There would be a rise in tide when we got there.

Q. Well, that didn't turn out to be the case.

A. I am told differently.

Q. You were told that, in fact, the tide had not changed when you got there?

A. I'm told there was a rising tide when we got there.

Q. Is that what you expected?

A. Yes.

CARCO goes as far as to suggest that Teal didn't know the tide was falling on the up-river trip. Issues Br. at 79. It is preposterous to suggest a state and federally licensed River Pilot

of 33 years experience who piloted several thousand ships up and down the Delaware River, could not tell whether the tidal current was ebbing or flooding. (*Trial Tr. Day 2, September 22, 2010, Teal, at 17:5-11<sup>498</sup>, 18:8-10<sup>499</sup>*). Teal testified he knew the tide was falling, as did the Master, because they discussed it beforehand. (*Trial Tr. Day 2, September 22, 2010, Teal, at 30:19-23<sup>500</sup>, 74:5-9<sup>501</sup>, 76:13-20<sup>502</sup>; Trial Tr. Day 15, October 18, 2010, Markoutsis, at 24:17-24<sup>503</sup>*). Teal also testified he knew the tidal height from visual cues on the river, and it was just a normal falling tide. (*Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23<sup>504</sup>, 59:8-11<sup>505</sup>*).

It is nonsensical for CARCO to say the ship “transited the entire River at or near dead low tide,” and there was an “ebbing current throughout the entire river transit.” Issues Br. at 66, 77. The trip was eight hours long, which is normal for a ship stemming the tide (sailing against the ebb current). (*Trial Tr. Day 2, September 22, 2010, Teal, at 37:20-21<sup>506</sup>; Trial Tr. Day 11, October 7, 2010, Carroll, at 76:23-77:1<sup>507</sup>*). A tide cycle is six hours. Therefore, an eight hour transit encompasses every stage of tide. That is one of the reasons it makes no sense to criticize Teal for taking the ship up the river on a falling tide. There was nothing untoward about the fact that the tide was falling during the latter part of the trip. It only mattered that the tidal current was flooding when the ship entered the anchorage.

It was perfectly fine for a Panamax size ship like ATHOS I to transit up-river on a falling tide. A MAC advisory recommended that ships with a draft in excess of 37’, and ships over a Panamax size beam (width) of 106’ with a draft over 35’ 6”, transit the river on the flood tide. (*Ex. D-1272, p. 3, ¶¶ 2, 3*). ATHOS I’s draft was not 37’ and her beam was not over Panamax size.

CARCO argues MAC’s transit advisories are based on “normal tide and weather conditions,” Issues Br. at 80-81, ignoring both sides’ experts and both Pilots, who all said the

tides *were normal*, notwithstanding that the rise was lower than predicted and the water level was just 2.4” lower than the charted depth when the ship entered the anchorage. (*Trial Tr. Day 21, November 3, 2010, Cole, at 87:6-88:2*<sup>508</sup>, *91:1-12*<sup>509</sup>, *91:25-97:2*<sup>510</sup>; *Trial Tr. Day 6, September 29, 2010, Capone, at 118:15-19*<sup>511</sup>; *Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23*<sup>512</sup>; *Trial Tr. Day 8, October 4, 2010, Bethel, at 8:9-17*<sup>513</sup>, *9:12-20*<sup>514</sup>).

CARCO’s other criticisms of River Pilot Teal are equally unfounded. It remarks that Teal did not read the ship’s draft marks when he boarded in the bay, but stops short of citing his testimony that it was impossible to make out the marks due to the wave action as the ship was moving at eight knots. Issues Br. at 89, (*Trial Tr. Day 2, September 22, 2010, Teal, at 67:20-68:7*<sup>515</sup>; *Trial Tr. Day 34, December 2, 2010, Betz, at 73:3-23*<sup>516</sup>).

CARCO claims Teal did not discuss under-keel clearance with the Master, but ignores his testimony that “. . . I explained the under-keel clearance and he agreed and we went.” (*Id. at 76:17-20*<sup>517</sup>); Issues Br. at 91.

CARCO remarks that Teal did not specifically discuss the crew’s UKC calculations, but ignores his testimony: “our conversation superseded that.” (*Trial Tr. Day 2, September 22, 2010, Teal at 102:8-20*<sup>518</sup>); Issues Br. at 91.

CARCO alleges Teal did not discuss the ship’s squat characteristics with the Master, Br. at 91-92, ignoring his testimony that “I’ve had panamax vessels before under similar conditions and I didn’t anticipate any problems with it [squat] at all,” and “I anticipated negligible squat on the ship,” and “it [squat] was dismissed after I found out the handling characteristics and the conditions of what was going on with the ship,” and “Q. Did you consider squat? A. I considered it.” (*Trial Tr., Day 2, September 22, 2010, Teal, at 25:2-6*<sup>519</sup>, *27:5-10*<sup>520</sup>, *33:7-8*<sup>521</sup>, *103:15-18*<sup>522</sup>). And, at *70:11-16*:

Q. What else did you ask him.

A. I told him that I had ascertained the tide predictions and the state of the current and the state of the tide, at the moment and with his draft, that the squat of the ship should be negligible and that I anticipated about a one and a half to three meters for the entire trip and possibly more.

Teal also testified that should any issue of a reduction in UKC arise, he would manage it by reducing the up-river speed, as he has done many times before. But no such issue arose on *ATHOS I*. *Id.* at 28:10-30:1<sup>523</sup>; 37:2-11<sup>524</sup>).

CARCO alleges Teal and the Master did not discuss tidal heights and currents, ignoring the above testimony. Issues Br. at 93. The single question CARCO cites asked only whether there was a “specific discussion” about the tide that would be available on arrival at Paulsboro. (*Trial Tr. Day 2, September 22, 2010, Teal, at 76:9-12*<sup>525</sup>). Knowing the tide at the mouth of the river when Teal boarded doesn’t tell what the actual state of the tide will be eight hours later, 80 miles up-river. (*Trial Tr. Day 34, December 2, 2010, Betz, at 173:6-12*<sup>526</sup>). By the time the ship arrived off Paulsboro, the tide would be in another cycle and the difference between the predicted and actual tide could have changed. But Teal and the Master did discuss the fact that they would transit on a falling tide. The specifics pertinent to the approach from the channel to CARCO’s terminal were the Docking Pilot’s jurisdiction, not Teal’s. If the water level was too low or the flood current was not running when the ship neared the Billingsport Range, opposite CARCO, she could have slowed down, or continued up-river and then turned around, or anchored, until the tide rose or the current began to flood.

CARCO claims Teal did not know the difference in draft between fresh and salt water. Issues Br. at 89. That difference was irrelevant, because the Master gave Teal the *fresh water* draft, which is the deepest draft the ship would reach. (*Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18*<sup>527</sup>).

CARCO's effort to make it appear Teal and the Master discussed almost nothing about the up-river voyage is utterly unfounded. They discussed exactly what would be expected of a River Pilot of 33 years experience and a ship's Master of 19 years of casualty-free experience as a deck officer. (*Trial Tr. Day 13, Markoutsis, at 191:20-192:4*<sup>528</sup>). The subjects included the proper time for a Panamax size vessel like ATHOS I to proceed up the river, the ship's condition and handling characteristics, the ship's draft, the state of the current and tide, the intended speed, the anticipated negligible squat of the ship, and an anticipated under-keel clearance of 1 1/2 to 3 meters (about 5' to about 10') during the up-river voyage. (*Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18*<sup>529</sup>, *34:1-7*<sup>530</sup>, *70:6-16*<sup>531</sup>, *76:13-20*<sup>532</sup>, *78:1-3*<sup>533</sup>, *83:5-84:14*<sup>534</sup>, *93:12-15*<sup>535</sup>, *93:19-24*<sup>536</sup>, *101:14-102:7*<sup>537</sup>, *103:3-18*<sup>538</sup>). The "Master/Pilot exchange" was ongoing throughout the 80 mile voyage. (*Id. at 93:1-7*<sup>539</sup>).

**(b) Bethel and the approach through the anchorage.**

The Master/Pilot exchange between Docking Pilot Bethel and the Master was normal and satisfied all requirements. (*Trial Tr. Day 34, Betz, at 71:23-73:2*). If anything, the conversation was more detailed than usual because Bethel was with an apprentice and engaged him in the conversation about the forthcoming maneuver. (*Trial Tr. Day 8, Bethel, Day 8, at 10:20-12:4*<sup>540</sup>).

CARCO contends no voyage plan was prepared for crossing the anchorage, citing its experts, Haley, Bergin and Stoller. Issues Br. at 96. All of that testimony was the same. It was all to the effect that the Docking Pilot changed the plan by deciding the ship would have to turn around 180° to berth port side to the pier, in order to face into the current, and the ship would pass over a charted 38' sounding. *Id.* As previously discussed, the Master and Docking Pilot *did* discuss the supposed 38' spot, Bethel assured the Captain it was safe, the depth was in fact



greater than 38', the ship passed safely by the spot (and may not have actually gone over it), and the existence of that sounding on the chart was not a proximate cause of the casualty.

CARCO contends the Master did not tell Bethel about Frescati's supposed policy requiring a 10% safety margin. *Id.* at 97. As previously discussed, a 5% policy applied at Paulsboro, but CARCO prefers to ignore that testimony.

CARCO argues Bethel did not use his telephone to obtain actual tide height, *id.*, but ignores his testimony in the immediately preceding questions that he could *see* the tide height against various landmarks. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 65:2-66:10*<sup>541</sup>). Bethel *anticipated* the tide might be a foot less than *predicted*. When he got out on the river, though, he saw the water level against various landmarks and determined the tide was not as far off from the prediction as he had anticipated. The observed tide was normal and no cause for concern. (*Id. at 8:4-17*<sup>542</sup>, *9:5-20*<sup>543</sup>; *64:22-65:9*<sup>544</sup>, *68:1-6*<sup>545</sup>). Consistent with Bethel's observation, Cole acknowledged that a Pilot observing the tide at Philadelphia at 8:00 p.m. would see that the actual tide was essentially the same as the predicted tide. (*Trial Tr. Day 21, November 3, 2010, Cole, at 109:25-110:10*<sup>546</sup>).

CARCO wrongly contends Bethel knew the "controlling" depth in the anchorage was 37' and didn't inform the Master. Issues Br. at 98. That is not what Bethel said. CARCO's counsel merely had him identify an Army Corps of Engineers Channel Statement dated January 30, 2004 that showed soundings of 37'. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 80:7-82:9*<sup>547</sup>; *Ex. D-1174*). However, as previously discussed, those soundings were in the *north* end, some two miles beyond where the ship had to go to reach CARCO's terminal. (*Trial Tr. Day 8, October 4, 2010, Bethel at 81:2-82:9*<sup>548</sup>, *95:4-12*<sup>549</sup>; *Trial Tr., Day 10, October 6, 2010, DePasquale, at 102:14-103:2*<sup>550</sup>).

The January 30, 2004 Channel Statement also said the project depth was 37'. However, the Army Corps witness testified that was just a mistake; the project depth has always been 40' and the statement was corrected in 2005. (*Trial Tr. Day 10, October 6, 2010, DePasquale, at 101:8-10<sup>551</sup>, 108:24-109:9<sup>552</sup>; 111:13-112:7<sup>553</sup>*), discussing Ex. P-687, which is the same as Ex. D-1174.

CARCO also wrongly contends Bethel knew the controlling water depth would be 37' at the 38' foot spot because the tide was one foot lower than predicted. *Id.* As previously discussed, that is fallacious because the prediction was *above* MLLW while the actual tide was slightly below MLLW. Additionally, it was incorrect because Bethel correctly estimated the water level would be gained back before reaching that spot, and CARCO's own tide witness, Cole, thought the water level was no more than 2.4" below the charted MLLW depth when the ship entered the anchorage, which did not affect the safety of the ship's under-keel clearance.

CARCO contends Bethel did not calculate the predicted direction of the current, but proceeded on allegedly incorrect assumptions. Issues Br. at 99. In fact, Bethel did estimate when the flood current would begin to run (*i.e.* the direction of the current), by referring to the predicted low water at Billingsport Range, across the river from CARCO, and the usual duration of slack current, based on many years of experience as a Pilot and tug boat captain on the river. (*Trial Tr. Day 8, October 4, 2010, Bethel, at 47:25-48:4<sup>554</sup>*). Bethel did not guide the ship into the anchorage based on any incorrect assumption, but based upon the fact that he saw the flood tide had begun to run.

We have already addressed CARCO's nonsensical assertion that Bethel had a "local practice" to ignore the Docking Pilots Association's guidelines and wait until three hours before high water to dock the ships he piloted. Issues Br. at 100.

CARCO argues the Master failed to tell Bethel the ship had taken on ballast. Issues Br. at 100. There was no reason to discuss that because it happened eight hours earlier, and Bethel was told the ship's fresh water draft as it was on arrival off CARCO's terminal. (*Trial Tr. Day 8, October 4, 2010, Bethel, \at 10:23-11:7<sup>555</sup>; 24:23-25:1<sup>556</sup>*).

**K. There were no violations of regulations and the PENNSYLVANIA Rule is inapplicable.**

**1. There were no regulatory violations.**

CARCO alleges the crew and pilots violated various Coast Guard Regulations in carrying out voyage planning. Issues Br. at 50, *et seq.* It appears to suggest the Master and Pilots should have used prescribed language and forms to meet their regulatory obligations, like jet pilots performing a preflight check list on a 747. That is not the case. For example, a Pilot and Master will always discuss the amount of water they expect to have under the ship, but will not necessarily use the words "under-keel clearance." (*Trial Tr. Day 34, December 2, 2010, Betz, at 75:6-76:13<sup>557</sup>*).

The regulation applicable to a single-hull tanker, 33 C.F.R. §157.455(b) provides, in pertinent part, the Master:

. . . shall plan the ship's passage using guidance issued under paragraph (a) of this section and estimate the anticipated under-keel clearance. The tankship master and the pilot shall discuss the planned transit including the anticipated under-keel clearance . . . .<sup>14</sup>

That is exactly what the Master and Pilots did. They estimated and discussed, among other things, the anticipated under-keel clearance based on what they knew of the ship, her draft and handling characteristics, and the state of the tide and tidal currents, *supra*.

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<sup>14</sup> Paragraph (a) refers to the guidance a ship-owner should give a vessel regarding the factors in calculating deepest navigational draft and anticipated controlling depth, weather and environmental conditions, and conditions in which a Master must contact the ship-owner.

Not only do the regulations not require a particular way of calculating UKC, but the Coast Guard deliberately refrained from making such a requirement. “[P]rescriptive methods for calculating under-keel clearance not provided in final rule . . .” (*Ex. D-1201 (Coast Guard Navigation and Vessel Inspection Circular No. 2-97, Change 1)*).

For all vessels, 33 C.F.R. § 164.11 provides, in pertinent part, that the Pilot shall be informed of the draft, maneuvering characteristics, vessel peculiarities, and any abnormal circumstances, *id.* at (k); and that the person directing navigation shall know the current’s direction and velocity, *id.* at (l), the tidal state, *id.* at (n), and “the tendency of the vessel underway to squat and suffer impairment of maneuverability when there is small under-keel clearance,” *id.* at (p). The Master and pilots complied. They discussed the ship’s draft and characteristics, and the current and tidal state, *supra*. There was no squat that would impair the ship’s maneuverability, according to the Master and both Pilots, *supra*. That was particularly true in the anchorage, where the ship was not “underway” and there was virtually no squat at all, as CARCO’s experts admitted.

The Master and Pilots were experienced professionals, knew what information was relevant, and discussed it in professionals’ terms, like every other Master and Pilot. There was no required form of words or documentation. The Master said it was customary to write the voyage plan directly on the navigation chart and separate pieces of paper, and then to complete a Frescati voyage form *after* the voyage, as a record of what was done. It was not possible to complete Frescati’s form until after the voyage because some information could not be known

until then, and plans often change. (*Trial Tr. Day 13, October 13, 2010, Markoutsis, at 214:5-216:13*<sup>558</sup>; *Trial Tr. Day 14, October 14, 2010, Markoutsis, at 125:10-127:4*<sup>559</sup>).<sup>15</sup>

Not a single civil or criminal citation, charge, or penalty, was imposed against Frescati or the vessel or her officers or Pilots for violation of any statute or regulation, following thorough investigations by the Coast Guard, NPFC, Department of Justice, the State of New Jersey, and the ship's Flag State. Consequently, Frescati was permitted to limit its strict liability and received reimbursement of \$88 million toward its clean-up costs. (*Trial Tr. Day 19, October 25, 2010, Morrison, at 167:19-168:10*<sup>560</sup>, *170:17-22*<sup>561</sup>, *171:1-8*<sup>562</sup>, *174:9-16*<sup>563</sup>, *175:5-7*<sup>564</sup>; *Trial Tr. Day 20, October 26, 2010, Hellberg, at 33:1-34:2*<sup>565</sup>, *42:1-6*<sup>566</sup>, *43:5-25*<sup>567</sup>; *Trial Tr. Day 15, October 18, 2010, Hajimichael, at 83:16-84:15*<sup>568</sup>; *Trial Tr. Day 19, October 25, 2010, Benson, at 53:12-54:3*<sup>569</sup>; *Exh. P-1287 (Citation from the USCG to the ATHOS I Unified Command Team)*; *Exs. USA-367 (Letter granting Frescati Limitation), USA-156 (Claim 1 Determination), USA-157 (Claim Determination Memo), USA-160 (Claim Acceptance Supplemental), USA-161 (Claims Determination Supplement)*)).

Limitation of liability would not have been permitted if Frescati had violated any "Federal safety, construction, or operating regulation." 33 U.S.C. § 2704(c)(1)(B).

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<sup>15</sup> A draft of Frescati's voyage form was prepared in the computer before the voyage, with blanks for information that was not yet available. After the voyage, the form was completed with any new information and any changes between the prospective plan and the actual voyage. (*Caro Dep. dated October 18, 2006, at 168:4-12; Caro Dep. dated October 19, 2006, at 55:17-57:14*). Originally, ATHOS I was to begin her transit in the morning, on a rising tide. However, CARCO delayed the docking because the berth was congested, (*Trial Tr. Day 11, October 7, 2010, Carroll, at 64:6-24*), so River Pilot Teal did not board until about noon. Teal and the Master discussed the fact that the ship would sail up-river mostly on a falling tide and planned the voyage accordingly, *supra*. Apparently, however, when Second Officer Caro, who had been off duty, was awakened after the accident and told to complete Frescati's voyage form, he mistakenly used the information for a rising tide.

**2. The PENNSYLVANIA Rule is inapplicable.**

The PENNSYLVANIA Rule holds that a vessel that violates a statute or regulation designed to protect against an injury must show not only that the violation did not, but could not have, caused the injury. The regulation, however, must delineate a clear legal duty, not open to judgment and assessment in a particular circumstance. *Tokio Marine & Fire Ins. Co. v. Flora M/V*, 235 F.3d 963, 966-67 (5th Cir. 2001); *Afran Transport Co. v. United States*, 435 F.2d 213, 218-19 (2d Cir. 1970). The regulations at issue here, discussed above, are very much open to judgment and, by their own terms, subject to Masters' and Pilots' assessment in particular circumstances.

Further, the PENNSYLVANIA Rule does not require a finding of causation "no matter how speculative, improbable, or remote." *Cliffs-Neddrill Turnkey Int'l Oranjestad v. M/T Rich Duke*, 947 F.2d 83, 88 (3d Cir. 1991). Here, causation was not only remote and improbable, but impossible.

The parties' experts agree the ship's draft was 36' 7" if no unrecorded water got into the ballast tanks. There is no *genuine* dispute about the fact that the River Pilot and Docking Pilot both saw the flood current had begun to run before the ship entered the anchorage. There is no *genuine* dispute about the fact that the tide was normal, notwithstanding that the rise in tide was below the predicted rise, and that, according to Cole, the water depth was a mere 2.4" below the charted depth. There is no *genuine* dispute that if the ship's draft was 36' 7" when she entered the anchorage, she was fully in compliance with the Docking Pilots Association's guidelines and had more than 5% under-keel clearance, and she had more than 10% under-keel clearance at the

anchor site.<sup>16</sup> Therefore, if her draft was 36' 7" when she began her approach, she did not and *could not have* caused the casualty.

Even if the draft had deepened due to CARCO's speculative extra ballast, CARCO's own theory is that the supposed ingress of extra ballast was unknown to the crew until after the casualty. Such unknown extra ballast, even if due to unseaworthiness or negligence, would violate no statute or regulation, and the PENNSYLVANIA Rule would have no application.

Moreover, CARCO's theory cannot show the ship's draft was as deep as 37' 6", which was the safe draft for crossing the anchorage at the start of flood current. Therefore, even under CARCO's prone-anchor, extra-ballast theory, the ship approached CARCO on a safe draft at an appropriate time, and did not and could not have caused the casualty.

Finally, in an excess of caution, we should point out that the PENNSYLVANIA Rule does not exonerate another party from liability. Rather, it permits an apportionment of damages between the regulatory violator and the other party. *Tokio Marine & Fire*, 235 F.3d at 966 (fault apportioned 80% against the non-violator).

**L. There was no unseaworthiness, failure of crew training, or failure of a safety management system.**

We have shown there was no unseaworthiness with respect to the ship's ballast system, and certainly none that could have caused the ship to strike the anchor. CARCO's generalized allegations of unseaworthiness, and failures of crew training and the safety management system, are irrelevant. Nevertheless, for an elucidation of the ample evidence demonstrating ATHOS I's seaworthiness and proper crew training and safety management system, we refer the court to, and

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<sup>16</sup> No statute or regulation prescribes a percentage of UKC, so any dispute about whether it should be 5% or 10% does not implicate the PENNSYLVANIA Rule.

incorporate herein, Section 3.2, pages 61-69, of Frescati's Brief on the Remaining Legal Issues Relating to Liability Only (Doc. 714).

Respectfully submitted,

Dated: February 13, 2015

/s/ John J. Levy

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<sup>1</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8 ("THE COURT: What was the vessel traveling immediately before it struck the anchor? THE WITNESS: Beyond the scope of my report, your Honor, but it would have been very slow, I'm sure. THE COURT: And then squat had nothing to do with it, right? THE WITNESS: Unless there were currents in the river that were contributing.")

<sup>2</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8 ("THE COURT: What was the vessel traveling immediately before it struck the anchor? THE WITNESS: Beyond the scope of my report, your Honor, but it would have been very slow, I'm sure. THE COURT: And then squat had nothing to do with it, right? THE WITNESS: Unless there were currents in the river that were contributing.")

<sup>3</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 67:20-68:7 ("Q Is it your -- did you make a determination whether or not to check the draft before boarding the ship? A It's almost impossible to do that. Q Why? A Because of the wave motion of the ship, the ship's moving through the water. There couldn't be an accurate determination, impossible. Q Was the ship moving slowly at that time, in order to safely board you? A Six to eight knots. Q And at that speed, you're saying that the wave action would obscure an accurate draft reading? A That's correct.")

<sup>4</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 73:3-23 ("Q Now, in your experience as a Pilot, when you board a vessel that's at sea; not at a dock, but at sea; do you attempt to read the drafts of the ship from the pilot launch? A No. Q Why not? A Well, when you're boarding a ship out in -- THE COURT: He doesn't want to drown. (Laughter.) MR. O'CONNOR: Exactly. THE WITNESS: Yes. BY MR. O'CONNOR: Q Other than drowning, why not? A Well, you know, you can look at the ship from the Pilot boat. Q Right. A The ship is still moving as you're boarding these ships, they're still moving through the water. Our typical boarding speed is six to eight knots. You've got weather, you've got waves, there's -- the ship has got motion in the seaway, you can't read the draft marks accurately when you're boarding a ship like that.")

<sup>5</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 4:3-5:19 ("THE COURT: Excuse me. Before you go on, how could you -- what calculations could you use to verify the visual -- the sighted draft? THE WITNESS: Knowing the weights that were on board from the ship's documents, your Honor, I could put those into the computer and verify they were giving the same within a reasonable tolerance drafts for departure at Puerto Miranda, and that's what I did. THE COURT: Did the computer know the size of the vessel, and what it weighs, and all that? THE WITNESS: Yes, your Honor, it does. It knows that quite accurately from the shape of the hull, which is defined in the computer, the positions of all the tanks, cargo tanks, ballast tanks, fuel tanks, domestic water tanks. That is quite a routine calculation that should be done on board. THE COURT: Whose computer are we using? THE WITNESS: I was using our own in-house computer, which is approved to do these calculations. BY MR. LEVY: Q Approved by whom? A Lloyd's Register of Shipping and other classification societies, including the American Bureau of Shipping. And I also had a copy of the ship's loading computer program, Anco, and we ran that program alongside the -- our own program, and, again, we got results which were within an acceptance tolerance. THE COURT: What's the acceptable tolerance? THE WITNESS: About an inch or inch-and-a-half, your Honor. THE COURT: Thank you. BY MR. LEVY: Q Okay. Now, these computer programs, are they custom made for the ship or custom tailored to the ship, I should put it that way? A Yes, they are. You have to fill the program out with the ship's data. As I said before, like the position of the tanks and so on, the center gravities of the tanks, and they're accurately put in. And then the approval process is to send test conditions to the classification society or the approving body, and they run their own program and check the results against our submitted results.")

<sup>6</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 41:20-42:6 ("Q Now, the Judge asked you before whether the water was fresh water at Puerto Miranda, and you said, Yes, it was. How do you know it was fresh water? A I checked the water for salinity with a salinometer, and I found at -- I found the density 0.998. Q Let me make sure I understand what you're saying. Are you saying that you used a salinometer to measure the density of the water, and you found the density to be .998? A Yes, of course. We took -- we took water from the lake. It was -- and -- and with a salinometer I discovered, I found out that the density of the water was 0.998.")

<sup>7</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 71:22:24 ("Q And it's full fresh water by the time you get to Paulsboro? A That's correct.")

<sup>8</sup> Trial Tr. Day 13, October 13, 2010, Markoutsis, at 200:7-10 ("Q Now, Captain, you were asked to load to a draft of 37 feet. Did you agree to do that? A No, I don't agree. I was afraid of that draft, so I choose -- I prefer -- I

decide to load less. Q And what draft did you decide to load the ship to? A At... I decide to load the ship at 36 and 6 inches. Q And why did you decide to load the ship 36'06, instead of the full 37 that you were requesting? MR. WHELAN: Objection, your Honor. It said 37 feet or less. Mr. Levy is mischaracterizing the voyage instructions. THE COURT: Oh, for heaven's sake. We all heard it. Relax. You may answer the question. THE WITNESS: I decided to do that because as I say before, I have a experience from the -- from the Maracaibo Lake and the channel, especially with the channel. So I knew that other -- other companies -- other ships of the company load less -- less draft than 37. I contact the operator of Citgo, of -- or excuse me -- or from Heidmar, and I -- I inform him about my thoughts, and he told me that ships the same size like my ship they load to 37. I contact also the operator from Tsakos Shipping, and captains of other ships who work on this area, and they told me that they -- they load 36 and 6, so I decide to load on this draft. BY MR. LEVY: Q On which draft? A On 36 and 6 inches. Q 36 feet and 6 inches? A Yes, sir.")

<sup>9</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 22:21-23:15 ("Q Did you discuss the voyage instructions with Captain Markoutsis when they came to the ship? A Yes. Q And did Captain Markoutsis agree to load the ship to 37 feet draft, fresh water? A At the beginning he gave me instructions to load the ship based on 36 feet, because he had experience from Malakabu (sic "Maracaibo") Lake (ph), that we had a draft limitation there. Q What was the draft limitation there? A From his experience, he told me that we should have not loaded more than 36 feet, 6 inches. Q Did Captain Markoutsis eventually decide to load the ship to 36 feet, 6 inches? A After he communicated with the charter with his and with the owners, he decided to load the ship at that draft, 36 feet, 6 inches. Q I'm sorry, I coughed during your answer. Did you say the captain decided to load the ship to 36 feet, 6 inches? A Yes.")

<sup>10</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 135:10-136:3 ("Q Okay. Following your inspection of the anchor in Baltimore -- sorry, in Philadelphia in 2005 and looking at all of that, over the course of this litigation did you gather more information about the ship and about the draft of the ship as well? A Yes. With respect to the draft, I was asked to analyze the vessel's departure drafts from Puerto Miranda by looking at the weights on board the ship when it left Puerto Miranda, by looking at the ship's documents, which recorded the fuel, water and cargo on board the ship on departure. And I put that data into our own computer program for -- which computes the trim and draft of a ship for a given number of weights that are put into the program. And I also was given a copy of the vessel's ship loading computer program, ANCO (ph.), which essentially did the same thing, and we found that we got very good agreement between them that on departure at Puerto Miranda the draft was 30 foot -- 36 feet, six inches. Q On departure from Puerto Miranda? A On departure.")

<sup>11</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 136:21-137:8 ("Q Okay. Now, you were starting to explain your opinion on the drafts at Puerto Miranda; how did you arrive at the opinion that the ship's draft prior to the -- just prior to the incident was about 36 feet, six inches -- I'm sorry, 36 feet, seven inches, freshwater? A Well, as I was saying earlier, we looked at the ship's -- all the ship's documents for departure at Puerto Miranda and knowing the weights recorded in the documents, we put those into our computer program and confirmed at least by the program that the vessel left Puerto Miranda with a draft of 36 feet -- Q Okay, Mr. Bowman -- A -- six inches.")

<sup>12</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 138:5-139:7 ("Q Did you also look at the documents that showed the observed draft at Puerto Miranda as being 36 feet, six inches? A Yes, I did. Q And did you look at the BSI ullage report, the PDVSA ullage report and the ship's ullage report? A Yes, I did. Q And did those documents tell you that the ship's draft, at least by those people who observed it, was 36 feet, six inches on departure from Puerto Miranda? A Yes, it did. Now, the computer program that you used, what is that called? A Uh, the program we use in TMC, which is our program, is called Seamaster, and the ship's approved program is called Ancho (sic "Anko"); we used both. Q Okay. And did both programs predict, based on the weights on board, that the ship should have about a 36-feet-six-inch draft in freshwater upon loading at Puerto Miranda? A Yes, both programs did. Q Now, how reliable are those programs, the Ancho (sic "Anko") program and the Seamaster program? A Well, they are very reliable, if you have the accurate information to put into them, of course. They are approved by Lloyd's Register, who checked these programs before they're allowed to be used on the ship, and our own program is in fact approved by Lloyd's Register and other classification societies for that use.")

<sup>13</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 140:2-7 ("Q All right. Do I understand that you took into consideration all of those weights, you inputted them into both the Seamaster program and the Ancho (sic "Anko") program, and both of those software programs gave you a predicted draft of 36 feet, six inches on departure from Puerto Miranda? A That's correct, yes.")

<sup>14</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 3:21-4:10 ("Q Can you give us the first way you did it? A The first way was to take the drafts on departure at Puerto Miranda. Q Were they the observed drafts? A They were the observed drafts, and by calculation verify those, and then take into account the consumables used during the voyage to Paulsboro and -- THE COURT: Excuse me. Before you go on, how could you -- what calculations could you use to verify the visual -- the sighted draft? THE WITNESS: Knowing the weights that were on board from the ship's documents, your Honor, I could put those into the computer and verify they were giving the same within a reasonable tolerance drafts for departure at Puerto Miranda, and that's what I did.")

<sup>15</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 5:20-6:20 ("Q Okay. So you started with the ship's observed conditions -- observed drafts, you verified or confirmed them with a reasonable degree of tolerance using these software programs, and then what did you do to get to the ship's approval draft, the first method? A I then looked at the ship's documents, as I said, for the voyage, which principally the engine logbook, which records the consumptions on a daily basis of the fuel, fuel oil for the main engine, the diesel oil for the generators, and then domestic fresh water, and allowed for those consumptions for the duration of the time it took for the voyage to Paulsboro. Q Approximately how much weight was consumed as the ship would have traveled from Puerto Miranda up to Paulsboro, in terms of fresh water and bunkers? A Approximately 400 tons. Q Okay. And approximately how many tons of ballast did the ship take on? A Approximately 500 tons of ballast. Q Okay. And did you work out the locations where the consumables came from and where the ballast was taken from? A Yes, that was taken into account in the calculations, as I said before, knowing where the tanks are in the vessel. Q And what did that give you by way of an arrival draft? A That gave an arrival draft of 36 feet, 7 inches. Q Is that a mean draft? A That's a mean draft in midships.")

<sup>16</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 40:11-41:6 ("Q When were you loading the ship at Puerto Miranda, how did you determine when to stop loading cargo? A Two hours before reaching the acceptable ullages for cargo, I called the loading master at the terminal, and told him to reduce the rate to 15,000 barrels per hour. At the same time I -- I set outside to the dock two second officers to watch the draft forward and aft, and -- and to report back to me every centimeter of draft -- of draft. Ten -- ten minutes before completion, I called the terminal and the loading master, and I gave a ten minute -- a ten minute notice to reduce the rate to the minimum and to -- and to stand by. I had continuously -- I stayed in continuous contact with the second officers who read to me the draft, and when they reported back to me that the draft was 13 -- 36 feet, 3 inches -- 6 inches, I'm sorry -- or 11 meters point. 12 centimeters, I called the terminal and told them to stop loading operations. Q After you completed your loading operations, was there any list to the ship? A No, there was no list. The ship was in an even keel condition.")

<sup>17</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 42:7-43:23 ("Q After you instructed the terminal to stop loading the cargo, did you personally observe the drafts of the ship? A Yes, of course. After I gave instructions to the terminal to stop loading, I closed the final cargo tanks, as well as -- as well as the manifold that were connected to shore, and I came -- I went out shore -- I went ashore on the jetty and personally checked the draft of the ship. Q What -- THE COURT: Where do you see the figures of the draft of the ship, what part of the ship were they on? THE WITNESS: Forward, midship, and aft. BY MR. LEVY: Q And what draft did you observe from the jetty after the ship was loaded? A 11 meters, 12 centimeters -- 11 meters point 12 centimeters, or 36 feet, 6 inches. Q Are you saying 11.12 meters? A 11 meters point 12 centimeters. the drafts of the ship after the ship was loaded? THE INTERPRETER: I'm sorry, sir? Citgo? BY MR. LEVY: Q The Citgo -- A The Citgo -- Q -- surveyor from BSI? A Yes, of course. I saw him at the jetty, and while he was taking also, looking also at the draft, and -- and later on we both returned back to the ship to the control room. Q Did the PDVSA loading master, did you see him also make an independent observation of the draft after the ship was fully loaded? THE INTERPRETER: Could you repeat the initials? BY MR. LEVY: Q PDVSA, PDVSA. THE INTERPRETER: DPV. BY MR. LEVY: Q P as in Paul, D as in David, V as in Victor, S as in Sam, A as in apple. A To observe the drafts. When I was going up the gangway, I -- I saw the loading master who was also checking the drafts, and then he came on board and came into the cargo control room.")

<sup>18</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 12:22-13:3 ("Q Okay. Now, did you calculate the departure draft from Puerto Miranda based upon the information you reviewed? A Yes, I did. Q And what was it? A 36 feet, 6 inches, even keel. Was that a fresh water draft? A Yes.")

<sup>19</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 60:7-14 ("Q Okay. You found that your calculated draft of the ship's departure from Puerto Miranda was consistent with the ullage reports that were done upon loading the

ship in Puerto Miranda? A Yes. Q Okay. And those ullage reports showed drafts of about 11.12 meters or 36 feet, 6 inches? A Yes.")

<sup>20</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 65:6-22 ("Q Now, Professor, when you use your GHS -- GHS is that the name of the software program? A Yes. Q When you use your GHS program, you input the loads on the ship in the various compartments, and then the program can tell you what the anticipated or expected draft of the ship would be, correct? A That's correct. Q Okay. So here you've done this for Puerto Miranda, correct? A Correct. Q That's what we're seeing here in P-1544, and we're seeing a baseline draft, which would be the mean draft at the center line midships of 11.135 meters, correct? A Yes. Q And that's approximately 36 feet, 6 inches, correct? A Yes.")

<sup>21</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 55:10-56:10 ("Q Why did you take on ballast at this time on November 26th? A According to charter instructions, voyage orders, the ship should arrive, should have arrived on an even keel at the port of discharge. During the five-day voyage from Venezuela to Paulsboro, we had fuel consumption and water. As a result, because these tanks are at the aft side of the ship, for the ship to come by the bow. MR. LEVY: Okay. Point to on this CAD drawing, if you would, where the bunker tanks or fuel tanks were located, and where the fresh water tanks were located? THE WITNESS: On this area it was the port side fuel tank. The other side was the starboard side. And also here the diesel oil tanks. And on the aft, somewhere there, there was fresh water in the tanks. MR. LEVY: And so during the voyage from Puerto Miranda to the pilot station, had bunkers and fuel been consumed by the ship, making the ship lighter aft? THE WITNESS: Yes, of course. MR. LEVY: And did that bring the ship slightly down by the head, by the bow? THE WITNESS: Yes. MR. LEVY: Okay. And is that why you took ballast on in the seven port tanks, wing tanks? THE WITNESS: Yes, for that and also to trimming the vessel and bring it to even keel again.")

<sup>22</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 13:4-22 ("Q Now, what did you determine the draft and trim to be in your analysis upon arrival at the entrance to Delaware Bay? A Upon arrival at the entrance to Delaware Bay, I performed a calculation of what the draft and trim would have been in fresh water under that condition of loading, and I determined that the fresh water draft would be 36 feet, 4 inches with one foot of trim down by the bow. Q And why was there a reduction of the draft, and a change in the ship's condition, in terms of trim, when the vessel arrived at the entrance of Delaware Bay? A Because during the course of the voyage, the ship would have burned off a quantity of fuel, and the fuel tanks are aft, so the -- the reduction in the amount of fuel would have changed -- would have reduced the draft, and the fact that the fuel tanks are aft, means that the aft end would have gotten lighter with respect to the forward end -- THE COURT: And you assume that -- THE WITNESS: - - which is the cause of the downward trim.")

<sup>23</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 54:14-57:8 ("Q Now, after November 25th, did you take on any ballast during the voyage to Paulsboro? We looked at the document showing no ballast on board on November 25th. Now I'm saying after November 24th, before the vessel arrived in Paulsboro, did you take on any ballast? A Yes, of course. Q And what day did you take on ballast? A November 26th before arrival at the pilot station. Q Approximately how much ballast did you take on at that time? A About 500 tons. Q In what tanks was that ballast placed? A No. 7 port, about three meters, and No. 7 starboard side, two-and-a-half meters. Q Okay. MR. LEVY: If we could put up the CAD drawing where we can show where the fuel tanks and fresh water tanks are. This is it. Thank you. If we could -- no, just leave it the way it is. BY MR. LEVY: Q Why did you take on ballast at this time on November 26th? A According to charter instructions, voyage orders, the ship should arrive, should have arrived on an even keel at the port of discharge. During the five-day voyage from Venezuela to Paulsboro, we had fuel consumption and water. As a result, because these tanks are at the aft side of the ship, for the ship to come by the bow. MR. LEVY: Okay. Point to on this CAD drawing, if you would, where the bunker tanks or fuel tanks were located, and where the fresh water tanks were located? THE WITNESS: On this area it was the port side fuel tank. The other side was the starboard side. And also here the diesel oil tanks. And on the aft, somewhere there, there was fresh water in the tanks. MR. LEVY: And so during the voyage from Puerto Miranda to the pilot station, had bunkers and fuel been consumed by the ship, making the ship lighter aft? THE WITNESS: Yes, of course. MR. LEVY: And did that bring the ship slightly down by the head, by the bow? THE WITNESS: Yes. MR. LEVY: Okay. And is that why you took ballast on in the seven port tanks, wing tanks? THE WITNESS: Yes, for that and also to trimming the vessel and bring it to even keel again. BY MR. LEVY: Q Okay. How did you determine how much ballast to take on? A I calculated with a computer on the ANKO calculator program, software program. Q The ANKO software program, is that sometimes called the Lodicator? A Yes. Q Is the ANKO software program a specialized computer program for the ATHOS 1 ship? THE INTERPRETER: Would you repeat the last word, sir?



BY MR. LEVY: *Q* Was it a specialized computer program specifically designed or specifically tailored to the ATHOS ship? *A* Yes, of course, only for the ship ATHOS, and it was -- and it was approved by the classification society of the ship. *Q* I'm sorry. Was approved by the classification society of the ship? *A* Society of the ship. *Q* And was that classification society Lloyd's Register of Shipping? *A* Yes.")

<sup>24</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 57:19-58:18 ("MR. LEVY: Could we put up Exhibit P-471, Athos 000216. BY MR. LEVY: *Q* Captain Zotos, is this a page from the ballast water handling log? *A* Yes. *Q* And is this page all in your handwriting? *A* Yes. *Q* Okay. MR. LEVY: And if we could highlight from ballast water handling log through the handwritten entries, please. Cull it out. That's it. BY MR. LEVY: *Q* What did you record in this ballast water handling log with respect to taking ballast on November 26th, 2004? *A* That I put ballast in Tank No. 7 port, three meters sounding, and in Tank No. 7 starboard, two-a-half meters soundings. *Q* Okay. Why did you put more ballast in the 7 port tank than in the 7 starboard tank? *A* To correct the small list that the ship had in that point in time. *Q* How did the ship develop a list? What caused that? *A* Various consumptions in diesel -- in fuel and water which were not equal.")

<sup>25</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 141:4-8 ("*Q* Okay. And how much, approximately how much ballast was taken on to trim the ship? *A* The records I was given show that approximately 500 tons, I think 509 tons of ballast were taken on board before coming up the river or thereabouts, I don't know precisely where.")

<sup>26</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 3:12-20 ("*Q* Mr. Bowman, how many different ways did you verify that the mean draft of ATHOS 1 was about the 36 feet, 7 inches immediately prior to the ship contacting the anchor? And when I say "immediately prior to the ship contacting the anchor," rather than use that long phrase, I'm just going to call that the arrival draft, okay? *A* I understand. *Q* So how many ways did you -- *A* At least three.")

<sup>27</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 6:6-20 ("*Q* Approximately how much weight was consumed as the ship would have traveled from Puerto Miranda up to Paulsboro, in terms of fresh water and bunkers? *A* Approximately 400 tons. *Q* Okay. And approximately how many tons of ballast did the ship take on? *A* Approximately 500 tons of ballast. *Q* Okay. And did you work out the locations where the consumables came from and where the ballast was taken from? *A* Yes, that was taken into account in the calculations, as I said before, knowing where the tanks are in the vessel. *Q* And what did that give you by way of an arrival draft? *A* That gave an arrival draft of 36 feet, 7 inches. *Q* Is that a mean draft? *A* That's a mean draft in midships.")

<sup>28</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 68:18-69:4 ("*Q* - and what we have in front of you right now, or up on the screen, marked as P-1545, is from your report, and this is arrival -- is an arrival condition, according to your computer program, if the ballast had been taken as Chief Mate Zotos said they took? *A* Yes. *Q* Okay. And the draft that you get at that time pre-accident, is 11.145 meters; is that correct? *A* Yes. *Q* And that is 36 feet, 7 inches; is that correct? (Pause.) *A* Yes, yes.")

<sup>29</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 69:19-23 ("*Q* Now, so the arrival draft at Paulsboro for ATHOS 1 pre-incident, according to your calculations, was 36 feet, 7 inches, or 36.6 feet, assuming no other changes in loading occurred, correct? *A* Correct.")

<sup>30</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis at 14:20-15:2 ("*Q* All right. What does a 38 foot draft restriction at Citgo's berth have to do with your decision to come up the river or not come up the river when you did? *A* The first step I knew that the -- the river -- the channel that the berth is safe for my vessel. Then with this information, by telling me 38 feet, I knew my ship was 36 and 6 inches that measurement gave to me, so I can proceed to the terminal.")

<sup>31</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18 ("*Q* What did you do when you got on the bridge? *A* Greeted the captain. *Q* Did you have a discussion with him? *A* Immediately. *Q* What did you talk about? *A* The condition of the ship and all systems, whether they're functional or not. And I asked his draft after that and he told me the fresh water draft would be 36 feet, six inches on arrival in fresh water and at the terminal.")

<sup>32</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 24:23-25:1 (*Q*. Okay. And when you boarded the ATHOS the master and river pilot informed you that the vessel's draft was 36 feet, six inches? *A*. That is correct.)

<sup>33</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 137:25-138:4 ("*Q* In your view as a naval architect, is an inch deeper a significant amount for a 60,000 dead-weight tanker? *A* No, it's not. If you get agreement within two inches or around four centimeters, something of that order, that's very good agreement.")

<sup>34</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 5:5-7 ("THE COURT: What's the acceptable tolerance? THE WITNESS: About an inch or inch-and-a-half, your Honor.")

<sup>35</sup> Trial Tr. Day 12, October 12, 2010, Bowman, 6:21-25 ("Q Okay. Now, was there another way that you also arrived at the mean draft of 36 feet, 7 inches on arrival? A Yes, I also projected the draft or the arrival of the berth forward, so the observed drafts on the 29th of -- taken on the 29th of November.")

<sup>36</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 8:7-10:5 ("Q Okay. Now, you were saying you took the arrival draft as calculated as 36 feet, 7 inches, and you did some more calculations to get to the draft of November 29th; is that correct? A That's correct. Q Why did you pick the 29th for a checking point for the draft? A I chose the 29th because on that day the salvage Naval architect, Mr. Edgar, I understand that was his role, he was on board and he took -- observed drafts on the evening of the 29th of November. Q Was that also the day that the joint survey was done by the various interested parties including the Coast Guard, and BSI, and the ship? A Yes, that's correct. Q And so that's when they measured all the tanks, and the quantities that were in the tanks, and Mr. Edgar took -- observed draft readings? A That's correct, yes. Q All right. What was his observed draft reading, or the mean of his observed draft reading? A I think that was 11 -- I believe that was 11.44 -- Q Meters. A -- meters, right. Q Okay. A Within a reasonable tolerance. Q And did you, using the ship's documents, determine how much had been consumed, how much had been taken on, how much the 7 port tank had flooded, and things like that to take your calculation of the draft, from the arrival draft, to the date of the 29th of November? A Yes, I did. I took into account all the changes that were recorded in the documents from the ship, and on the ullage reports, and put those into the computer and did the same analysis again, and arrived at the draft, as I said, of 11 -- about 11.44, within one or two centimeters or an inch. Q Okay. THE COURT: As I understand it, this incident occurred on the 26th, right? THE WITNESS: That's correct, your Honor. THE COURT: And what does the measurements on the 29th have to do with anything? THE WITNESS: Your Honor, if we obtain the arrival draft on the 26th immediately before the incident, which I did, and then take into account the recorded changes of weights on board the vessel, and they're consistent with what is found on the 29th, then that seems to me good supporting evidence that the vessel did arrive, in fact, with that draft on the 26th.")

<sup>37</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 10:17-18:5 ("Q Okay. Now, did you also do a similar analysis of what the draft, the arrival draft was, and attempt to use David Hall's notes of what Oscar Castillo told him? A Yes, I did. Q Okay. MR. LEVY: Can we put up Oscar Castillo -- I'm sorry -- David Hall's notes, please, which would be P-495. BY MR. LEVY: Q You were here for Oscar Castillo's testimony concerning what he recalled about the drafts, weren't you? A Yes, I was. Q Okay. Looking at these drafts -- MR. LEVY: Now, if we can just pull up the right side of that screen, please, so we're looking at P-495. BY MR. LEVY: Q All right. Now, which of these drafts did you not take into consideration, or feel you could rely upon, in forming your opinion as to what the arrival draft was? And these drafts, let's assume they're taken on the 27th, the day after the incident? A Yes, I did not take into account the port and midship draft. Q Can you just point to it with the -- yes. A There. It's too vague and it's understandably so because at that time the highest draft mark on the ship -- the midships is at 13 meters, and with a list of approximately 7 degrees, that draft mark would have been submerged, and I believe that's why he was not able to record a reading. Q Okay. Before you go on -- THE COURT: Did the draft that he was able to record on the starboard side, does that enable you to calculate what the draft must have been on the port side? THE WITNESS: Your Honor, that's absolutely -- you're right, that's what I did do, that was one of the things I did. BY MR. LEVY: Q Okay. What else did you not consider, and then we'll go into -- A Okay. Q -- into what you considered and how you got there? A I've not considered the forward drafts. Q And why did you not consider those or -- A One of the -- Q -- consider them to be reliable? A There clearly seems to be some controversy about these forward drafts as they -- Q Did you say controversy? A Yes, I did. THE COURT: No, he said contravasy (ph). THE WITNESS: Oh, well, I beg your pardon. I meant that. The starboard forward draft of the vessel in the report obviously cannot be 12.1 (ph). There's a possibility that they could have been transposed, as written down by Mr. Hall, but he thinks that's unlikely. If you do transpose them there, then that makes it 12.1 on the port side, but I recall seeing a photograph taken by Mr. Umbdenstock of the port forward draft and there's clearly an oil line, maximum height of an oil line showing at 12 meters. MR. LEVY: Ted, could you put up the photograph EMS1946, please. That's P-494. Okay. And could you zoom in for us on both draft marks on both sides. Yes, perfect. BY MR. LEVY: Q Okay. Now, show us the oil mark that you were talking about? A I'm referring to this oil mark, which is at the base of the 12 meter mark and if it casts -- if a water line or an oil line come to that cast the bottom of the figure, then that is the precise draft at that point. Now, it's not exact. You can't tell it precisely that it's 12, but it's very close to 12. It's not 12.1, which would be in line with the top of the 2 and the 1. Q Okay. MR. LEVY: Can we go

back to Mr. Hall's note, please, so we're going back to P-494. BY MR. LEVY: Q Okay. So did you try to do an analysis of what the arrival draft was using the -- the observed drafts on the port -- I'm sorry -- on the starboard side midships and the aft draft readings? A Yes, I did. Q Okay. MR. LEVY: Could we just put up P-495-A, please. BY MR. LEVY: Q Okay. So does 495-A show which ones that are X'd out that you did not feel you could rely upon and which ones you could rely upon? A Yes, it does. Q Okay. Now, using the midship starboard side draft reading of 9.5, how did you use that to arrive at or to double-check the arrival draft of 36 feet, 7 inches? A Right. What I was saying earlier, I calculated the list from the two aft drafts which came out at 6.9 degrees to port. I then applied that list to the 9.5 draft and projected it to the port side. That came in at 13.4 meters. MR. LEVY: I'm sorry, Mr. Roby, can we put up P-949-B, please. Can we turn it -- okay. And can we take out in way of with add in. BY MR. LEVY: Q Okay. Now, is this the analysis that you did to arrive at what the predicted starboard side -- I'm sorry -- port side midship draft was using the starboard side draft as read by Mr. Castillo? A Yes, it is. Q Okay. Just jump us to the conclusion. What draft did you get to on the port side? A 13 -- THE COURT: He told us a minute ago. You made him take it down. THE WITNESS: 13.4 meters by projecting the inclined water line to the port side using an angle of list of 6.9 degrees. THE COURT: And at some point did you transfer meters into feet and inches? THE WITNESS: Your Honor, I did, but I can't remember it right at this moment. I can convert it for you if you wish. THE COURT: Okay. BY MR. LEVY: Q Okay. So you had a predicted, based on your calculation, what the draft would be on the port side midships, correct? A Correct. Q And so what was the mean draft then? A 11.45 meters, and that was obtained by adding together Mr. Castillo's observed 9.5 draft, the 13.4 projected draft on the port side and divide it by two, and that comes in at 11.45. Q And what does that show? What does that prove with respect to the arrival draft, if anything? A Well, I did an additional calculation using the computer for approximately 1100 hours on the 27th of November, when Mr. Castillo read the drafts, and the result of that calculation shows a draft at midships of 11.41 meters. And this is showing 11.45, which is just within an acceptable tolerance in my view. Q When you say just within, we're talking three, four centimeters? A Yes, we are. Q And what is that in inches? A It's about one-and-a-half inches. Q All right. And for a ship that weighs 60,000 tons dead weight, is that within an acceptable tolerance, in your view? A 64,000 displacement is dead weight -- Q Yes. A -- is without the live weight. Yes, I do, I believe it is. Q Okay. Now, did you also confirm through, using a photograph, of what the port side midship draft was as you predicted it would be? A Yes, I did. Q Okay. So you predicted it would be 11 -- 13.4 meters; is that correct? A That's correct. Q Okay. MR. LEVY: Can we see the photograph then 1953, EMS1953. BY MR. LEVY: Q Now, what does this photograph show to you with respect to where the water line was when the ship was listing 7 degrees? A Right. Well, we're looking at the port side at midship draft marks, and as I said, the maximum figure given is 13 meters, but because this is a good photograph taken closeup of the side knowing that these figures are .1 of a meter in height, and as you can see, that's 12.8, so the distance between the bottom of the 8 and the bottom of the 13 is .2 of a meter. You can scale (ph) using the photograph as I did up to the midpoint of this oil line, and in doing that, I arrived at a draft of 13.38 meters, which is within about 2 centimeters of the projected draft using Mr. Castillo's starboard value of 9.5 meters. Q Okay. So was this another way of you checking that the arrival draft of the ship was 36 feet, 7 inches? A Yes, it was. Q And, again, how does that do that, because you're looking at the draft the next day? A Because I did a calculation, as I said earlier, of what was on board the vessel taking into account the flat water, and cargo transfers that had taken place, and arrive at a draft of 11.41 meters. And by two ways, the way I've just described, taking the midpoint of this oil line. If you take that 13.38 and add it to the 9.5, it gives you a mean of midship draft of 11.44, and as I said earlier, if you project the 9.5 draft across, and take the mean of that, you get 11.45, which is within I consider an acceptable tolerance -- Q Okay. A -- with the calculation.")

<sup>38</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 10:17-18:5 ("Q Okay. Now, did you also do a similar analysis of what the draft, the arrival draft was, and attempt to use David Hall's notes of what Oscar Castillo told him? A Yes, I did. Q Okay. MR. LEVY: Can we put up Oscar Castillo -- I'm sorry -- David Hall's notes, please, which would be P-495. BY MR. LEVY: Q You were here for Oscar Castillo's testimony concerning what he recalled about the drafts, weren't you? A Yes, I was. Q Okay. Looking at these drafts -- MR. LEVY: Now, if we can just pull up the right side of that screen, please, so we're looking at P-495. BY MR. LEVY: Q All right. Now, which of these drafts did you not take into consideration, or feel you could rely upon, in forming your opinion as to what the arrival draft was? And these drafts, let's assume they're taken on the 27th, the day after the incident? A Yes, I did not take into account the port and midship draft. Q Can you just point to it with the -- yes. A There. It's too vague and it's understandably so because at that time the highest draft mark on the ship -- the midships is at 13 meters, and with a list of approximately 7 degrees, that draft mark would have been submerged, and I believe that's why he was not able to record a reading. Q Okay. Before you go on -- THE COURT: Did the draft that he was able to record on



the starboard side, does that enable you to calculate what the draft must have been on the port side? THE WITNESS: Your Honor, that's absolutely -- you're right, that's what I did do, that was one of the things I did. BY MR. LEVY: Q Okay. What else did you not consider, and then we'll go into -- A Okay. Q -- into what you considered and how you got there? A I've not considered the forward drafts. Q And why did you not consider those or -- A One of the -- Q -- consider them to be reliable? A There clearly seems to be some controversy about these forward drafts as they -- Q Did you say controversy? A Yes, I did. THE COURT: No, he said contravasy (ph). THE WITNESS: Oh, well, I beg your pardon. I meant that. The starboard forward draft of the vessel in the report obviously cannot be 12.1 (ph). There's a possibility that they could have been transposed, as written down by Mr. Hall, but he thinks that's unlikely. 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gives you a mean of midship draft of 11.44, and as I said earlier, if you project the 9.5 draft across, and take the mean of that, you get 11.45, which is within I consider an acceptable tolerance -- Q Okay. A -- with the calculation.")

<sup>39</sup> Trial Tr. Day 11, October 7, 2010, Castillo, at 35:4-18 ("Q When you went to the Athos on November 27th, did you record your draft readings in a notebook? A Yes, I did. Q And do you know where that notebook is today? A I don't know where is that notebook now. This notebook, when we fill it up, we -- I turn it over to the office and the office will keep it for us. Q Okay. And you haven't seen it since when, when was the last time you saw it? A I can't remember when I have turned it over to the office. Q Okay. THE COURT: But since you turned it over you haven't seen it, is that right? THE WITNESS: Yes, your Honor.")

<sup>40</sup> Trial Tr. Day 11, October 7, 2010, Castillo, at 36:9-14 ("Q Mr. Castillo, did you show to Mr. Hall your notebook containing your draft readings? A As far as I remember, I did not show him, I gave him the numbers. Q You told him what the numbers were? A Yes.")

<sup>41</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 178:10-179:6 ("Q Okay. And after you had requested that Caleb Brett be retained to assist you in conducting cargo measurements, what time did Caleb Brett arrive on the vessel? A I believe it was some time after 10:00 o'clock. Q And who was it from Caleb Brett that attended? A Oscar Castillo. Q Did you know Mr. Castillo before he attended the vessel? A No. Q Okay. And what were your discussions with Mr. Castillo when he arrived? A I explained to him, or confirmed with him, why he had been -- why his company had been retained, and told him we had a situation where we would need his expertise to help us establish what quantity of oil and water was on the ship. Q And what did Mr. Castillo do at that point? A Well, he told me he had read the draft before he pulled into the ship, and I was quite surprised because of the condition the ship was in, and -- and there was boom around the ship, and oil on the side of the ship. Q And did you discuss with him what his draft readings were? A Yes, I did.

<sup>42</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 179:23-180:1 ("Q Can you tell us -- I notice -- do you recognize this document, first of all? A Yes, it's my hurried notes that I made while talking to Mr. Castillo.")

<sup>43</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 10:17-16:8 ("Q Okay. Now, did you also do a similar analysis of what the draft, the arrival draft was, and attempt to use David Hall's notes of what Oscar Castillo told him? A Yes, I did. Q Okay. MR. LEVY: Can we put up Oscar Castillo -- I'm sorry -- David Hall's notes, please, which would be P-495. BY MR. LEVY: Q You were here for Oscar Castillo's testimony concerning what he recalled about the drafts, weren't you? A Yes, I was. Q Okay. Looking at these drafts -- MR. LEVY: Now, if we can just pull up the right side of that screen, please, so we're looking at P-495. BY MR. LEVY: Q All right. Now, which of these drafts did you not take into consideration, or feel you could rely upon, in forming your opinion as to what the arrival draft was? And these drafts, let's assume they're taken on the 27th, the day after the incident? A Yes, I did not take into account the port and midship draft. Q Can you just point to it with the -- yes. A There. It's too vague and it's understandably so because at that time the highest draft mark on the ship -- the midships is at 13 meters, and with a list of approximately 7 degrees, that draft mark would have been submerged, and I believe that's why he was not able to record a reading. Q Okay. Before you go on -- THE COURT: Did the draft that he was able to record on the starboard side, does that enable you to calculate what the draft must have been on the port side? THE WITNESS: Your Honor, that's absolutely -- you're right, that's what I did do, that was one of the things I did. BY MR. LEVY: Q Okay. What else did you not consider, and then we'll go into -- A Okay. Q -- into what you considered and how you got there? A I've not considered the forward drafts. Q And why did you not consider those or -- A One of the -- Q -- consider them to be reliable? A There clearly seems to be some controversy about these forward drafts as they -- Q Did you say controversy? A Yes, I did. THE COURT: No, he said contravasy (ph). THE WITNESS: Oh, well, I beg your pardon. I meant that. The starboard forward draft of the vessel in the report obviously cannot be 12.1 (ph). There's a possibility that they could have been transposed, as written down by Mr. Hall, but he thinks that's unlikely. If you do transpose them there, then that makes it 12.1 on the port side, but I recall seeing a photograph taken by Mr. Umbdenstock of the port forward draft and there's clearly an oil line, maximum height of an oil line showing at 12 meters. MR. LEVY: Ted, could you put up the photograph EMS1946, please. That's P-494. Okay. And could you zoom in for us on both draft marks on both sides. Yes, perfect. BY MR. LEVY: Q Okay. Now, show us the oil mark that you were talking about? A I'm referring to this oil mark, which is at the base of the 12 meter mark and if it casts -- if a water line or an oil line come to that cast the bottom of the figure, then that is the precise draft at that point. Now, it's not exact. You can't tell it precisely that it's 12, but it's very close to 12. It's not 12.1, which would be in line with the top of the 2 and the 1. Q Okay. MR. LEVY: Can we go

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<sup>44</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 78:11-19 ("To arrive at an accurate figure for the mean aft draft, it's necessary to correct the aft drafts to account for the symmetry of the water line due to the 7 degree list to port, correct? A And that is what Mr. Bowman did and that is what I did subsequent to receiving the draft readings that were recorded in Mr. Hall's notes. Q Okay. But initially you didn't do that; is that correct? A No.")

<sup>45</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 85:9-12 ("To arrive at an accurate figure for the aft draft, it's necessary to correct the aft drafts to account for the symmetry of the ship, correct? A Yes.")

<sup>46</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 27:3-18 ("Q Well, assuming the midships center line draft that you estimated to be 11.44 to 11.45, based on the new information, and the 7 degree list, and the drafts observed by Mr. Castillo, what would have been the minimum additional unreported ballast aboard the ATHOS I at the time of the incident? A Approximately 420 to 525 tons. Q And would that additional ballast be in addition to the 510 metric tons that's reflected on the ballast water handling log we looked at, which was D-9? A Yes. Q Now, assuming this minimum amount of ballast of -- unreported ballast of 420 to 525 metric tons, what would that have done to vessel's reported draft? A The midships center line draft would have been approximately 36 feet, 9 to 36 feet, 10 inches.")

<sup>47</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 98:16-20 ("Q Professor Petrie, you offered an opinion that the maximum draft of the ship, at the time of the incident, was between 36 feet, nine inches and 36 feet, ten inches, is that correct? A Yes.")

<sup>48</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 78:11-79:11 ("To arrive at an accurate figure for the mean aft draft, it's necessary to correct the aft drafts to account for the symmetry of the water line due to the 7 degree list to port, correct? A And that is what Mr. Bowman did and that is what I did subsequent to receiving the draft readings that were recorded in Mr. Hall's notes. Q Okay. But initially you didn't do that; is that correct? A No. Q In January of 2009, when you issued your first report, you took the aft draft reading and the forward draft reading, the means there, and you just added them together and divided by two to get 11.5? A That's the information I had at the time. Q Right. And that led you to create a scenario where the ship had 1,050 tons of ballast somewhere on board the ship, that was not recorded in any of the ship's documents -- A Yes. Q -- correct? A Yes. Q It also led you to -- I give the word "speculate" -- but to speculate that 350 tons of that ballast that was on on the morning of the 27th had been secretly removed by the ship by the morning -- by the 29th, when the joint survey was done; isn't that correct? A Yes.")

<sup>49</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 75:4-76:10 ("A And all I am doing here is to damage No. 7 port and No. 7 center. That is indicated right down here. Those two tanks are indicated as being flooded, okay? Flooding those tanks, in terms of the calculation, simply means we remove those tanks from the hull, leave

everything the same, and see where the ship would have floated, and this calculation shows that the ship would have floated at a mean draft of 11.399, and a heel angle of 5.88 degrees. Now, when I looked at Mr. Castillo's ullage report, he indicates the mean draft to be 11.5, not 11.4, or 11.399, and he indicates a heel angle of 7 degrees, and the 7 degree heel is borne out by other independent observations. So the page that we were looking at just a moment ago, the next page in the report, says, Okay, this calculation, just damaging those two tanks, taking where we were in agreement with Mr. Bowman, and damaging those two tanks, does not get us to where Oscar Castillo observed the ship to be on November 27th. In order to produce a draft of 11.5, in agreement with Mr. Castillo, I did the calculation on the following page that we just looked at, and obtained a calculated draft of 11.502, which I deemed to be in very close agreement with the 11.5 that Mr. Castillo had, and the heel angle of 7 degrees -- BY MR. LEVY: Q Okay. A -- if we look at the following page. Q Within -- A So that's what I've done. Q -- within a couple millimeters. Within a couple of millimeters, you're very close.

<sup>50</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 78:11-19 ("To arrive at an accurate figure for the mean aft draft, it's necessary to correct the aft drafts to account for the symmetry of the water line due to the 7 degree list to port, correct? A And that is what Mr. Bowman did and that is what I did subsequent to receiving the draft readings that were recorded in Mr. Hall's notes. Q Okay. But initially you didn't do that; is that correct? A No.")

<sup>51</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 20:3-16 ("Q And what was it? A I determined that to -- to cause the ship to float at the 11.95 draft forward, 11.05 draft aft, with a 7 degree port list, would require a quantity of 1,050 tons of additional ballast. Q And was there space aboard the ship to load that much ballast? A Yes. Q Could you provide us examples of the locations where this additional ballast could have been stored aboard the vessel? A Yes, in my initial report dated January 15th, 2009, I postulated one possible scenario, which would have 350 tons in 4 starboard, 400 tons in 4 port, 50 tons in 6 port -- I'm sorry -- 6 starboard and 250 tons in 6 port.")

<sup>52</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 173:23-25 ("Q And did you also enter one of the ballast tanks? A Yes, I went down 6 port.")

<sup>53</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 174:12-175:6 ("Q Okay. And what did you do upon entering 6 port? A Well, we were interested in confirming the -- what the condition of the structure of the vessel, and also I was interested to see the bulkhead and the bottom of the tank that was close to 7 port as possible. We knew there was damage in 7 port, so I was interested to see the after-bulkhead and the bottom of the tank. Q And what did you observe? A I observed the tank was well maintained. The coating was a dark, almost black color. These tanks are painted to prevent corroding. The coating was in very good condition. There was minimal rust. There was no wastage on the flanges of the -- all the structures in the tanks have flanges, and on a badly-maintained structure, the flanges start to corrode. There was no significant corrosion in this tank. Q Okay. Was there any water in the tank? A No, my memory is I went in there and came out to clean and dry. Q There was no water dripping on your head? A No.")

<sup>54</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 177:6-18 ("Q Okay. Just back a minute on your entry to 6P. Do you recall approximately how long you were down in 6P? A About 30 minutes. Q Okay. If the tank had recently been wet or full of water, would you have been able to tell? A Yes. Q And how would you have been able to tell? A I would have come out -- well, the tank would have been very wet and humid. There would have been water dripping everywhere. Q And that would -- A I don't like to get dirty and I have no recollection of being dirty or having to go for a change of clothes that day.")

<sup>55</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 212:3-213:5 ("Q And, in particular, you entered the No. 6 port ballast tank to determine the integrity of the water-tight transverse bulkhead, between that ballast tank and the damaged No. 7 port ballast tank? A That was the primary reason. Q Right, and... MR. WHELAN: If we could bring up Defense Exhibit 165, the bridge log at Page 18776? (Pause.) Okay. If we could focus in on 0940? (Pause.) BY MR. WHELAN: Q Now, that's the notation in the bridge log for the ATHOS I indicating that three persons went into the 6 port ballast tank for checking purposes, correct? A Yes. Q Yes, and then if you go up a little higher at 0736, there's an indication that you came aboard the vessel, correct, at 0736? A Yes. Q And then if you go up a little higher at an earlier, 0655, you have the surveyor, Mr. Rokicki (ph) -- I don't know if I'm pronouncing

that correctly -- the Lloyd surveyor was on board before you? A Yes. Q And you went down into the No. 6 hatch with yourself and two other persons, according to the deck log? A Yes.”)

<sup>56</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 20:17-21:5 (“Q And did you determine any other additional scenarios where the ballast water could have been located in tanks and still having the ship keep an even keel? A Yes, subsequent to preparing that report in January of 2009, I learned from testimony offered by Mr. Hall that he testified to the fact that there was no ballast in 6 port, so I did just another scenario keeping the same 350 tons in 4 starboard, reducing the amount in 4 port from 400 to 153, putting 497 tons in 5 port instead of 6 port, and keeping the same 50 tons in 6 starboard, achieved the same draft heel and trim as -- as in my report. So basically just re-proportioning the quantity of fluids in the 4 port and 5 port ballast tank provides one scenario that is equivalent. There are doubtless any number of possible scenarios.”)

<sup>57</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 55:2-58:1 (“Q Okay. You gave an opinion this morning about a new scenario for adding ballast to the ship to achieve the list and the trim that was recorded in that ullage report by Mr. Castillo, didn't you? A You're referring to the alternative arrangement of the 1,050 tons? Q Yes, I am. A Yes. Q And that's new, right? A Yes. Q May I have it? (Pause.) A Sure. THE COURT: If it's any consolation, I have yet to understand what opinions he has that affect anything other than the reports of other experts. MR. LEVY: Hopefully we'll straighten some of that out, your Honor, if it's possible. THE COURT: Go ahead. BY MR. LEVY: Q Okay. You also formed an opinion that there was a maximum of 420 to 525 tons of additional ballast on board the ship prior to the incident, in addition to the 510 tons that the chief mate reported taking on board? A Yes. Q And that wasn't in any of your prior reports, was it? A The prior report indicated 1,050. Subsequent the information from Mr. Hall's notes, I revised that 1050 to the values that I have testified -- have offered in testimony today. Q And when did you supply that to counsel for Citgo? A I have no idea what information was provided to Citgo at what time. Q Did you provide a supplemental report to Citgo giving these two new opinions that we've just talked about? MR. WHELAN: Objection, your Honor. There was a supplemental report issued on January 31 which was discussed -- THE COURT: That's what he's being asked. Why do you object? BY MR. LEVY: Q Because that supplemental report didn't have anything to do with these opinions, did it, Professor Petrie? A (No response.) Q Your January 31st, 2010, supplemental report had nothing to do with the opinions that's on this little piece of paper that you handed to me this morning, and the opinion about the 420 to 525 tons of additional ballast? A The supplemental report that you're referring to offered the opinion that there was 1,050 tons distributed in accordance with -- with my -- the table provided in my report. Can you back up and give me the date of the report you're referring to? I'm sorry. There's way too many reports involved here. Q Your January 31st -- THE COURT: Any particular year? BY MR. LEVY: Q -- 2009, report did not include the intact condition which you've just handed to me this morning; is that correct? A The January 2009, report includes the intact condition depicted at the top piece of that paper, the 1050 tons including 250 tons in 6 starboard, okay? Q Okay. And the -- A So the top table -- Q -- alternative ballast -- A -- the top table is exactly the information that was contained in my January 2009 report, and subsequently my deposition was taken, and I was asked if there were other -- and, in fact, I think the report indicates that this was only one of many possible scenarios. **Subsequently, I came to learn that Mr. Hall testified that there was no liquid in 6 port, and I postulated an alternative scenario that is equivalent to the 1050 in my original report**”). (Emphasis added).

<sup>58</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 80:11-25, 81:19-82:10, 82:21-83:5 (“Q Yes, you issued two reports on July 30th. Okay. So between the time you issued your first report, and the time you issued one of your July 30th, 2009 reports, you learned that David Hall had been down in the 6 port ballast tank, and there was no ballast in there, and, therefore, the scenario that you had proposed for 1,050 tons of ballast, and how that ballast was distributed on the ship, proved to be incorrect? A The scenario that assumed -- the scenario that assumed 250 tons of ballast in the 6 port was not a credible scenario, if Mr. Hall is correct in his contention that there was no ballast in 6 port, okay? Q Well, none of your scenarios that propose ballast in any of the ballast tanks are credible, if there was no ballast in those tanks, correct? Q Okay. So, again, the document we have here as P-1546 is the scenario that you created where you put 1,050 tons of ballast on board the ship in addition to the 510 tons of ballast that the ship and the crew reported they had taken? A Yes. Q Okay. And in that scenario, you put 250.13 tons in the 6 port ballast tank, correct? A Yes. Q All right. And that was done in January -- you did this scenario in January of 2009. Then after that you learned that David Hall had been down into this tank, there was no ballast in that tank, so you knew this scenario was no longer valid, correct? A Yes, and I had -- Q Okay. A -- I had allowed in my report that there was any number of possible alternatives to this scenario. Q Okay. So it's your testimony that there's a whole variety of ways ballast can be put on to the ship to achieve the 7 degree list, the damaged condition as it



existed on November 27th, 2004, other than this condition that we have shown here at 1546, correct? A Correct. Q And when I took your deposition, you hadn't created any of those conditions, but you created one in the last couple of weeks that you brought in here in court? A That's correct.")

<sup>59</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 54:15-55:11 ("Q Professor Petrie, some of the opinions you gave this morning are new to us, aren't they? THE COURT: Are what? MR. LEVY: New to us. THE COURT: How does he know what you knew before? MR. LEVY: Oh, he knows. BY MR. LEVY: Q Right -- A Yes. Q -- they weren't contained in any of your reports, were they? They were not contained in my reports. Q Okay. You gave an opinion this morning about a new scenario for adding ballast to the ship to achieve the list and the trim that was recorded in that ullage report by Mr. Castillo, didn't you? A You're referring to the alternative arrangement of the 1,050 tons? Q Yes, I am. A Yes. Q And that's new, right? A Yes.

<sup>60</sup> Trial Tr. Day 9, October 9, 2010, Umbdenstock, at 34:24-35:13 ("Q Okay. Now, was a salvage operation eventually undertaken? A Yes, it was. Q Okay. And can you just describe for us in general sort of step-by-step how that worked? A The idea was to bring the ship upright, to -- it was listing and trimmed, and we needed to level it out for a couple of reasons: One was to -- so you could get accurate cargo readings in the actual readings of the contents of the tanks, and the other was to... I'm sorry, was to establish where -- what the limiting drafts might be of the ship in its present condition. Q Okay. How was that achieved? A It was achieved by transferring weights on board the ship, liquids.").

<sup>61</sup> Trial Tr. Day 9, October 9, 2010, Umbdenstock, at 35:23-36:3 ("Q Once the ship was -- once the list was taken off the ship, what was the next step in the operation -- or, I'm sorry, first can you tell us, when was the list taken off the ship? A The list was taken off on the -- later that day on the 27th -- or the 28th, I guess, the next day.")

<sup>62</sup> Trial Tr. Day 9, October 9, 2010, Umbdenstock, at 76:4-78:10 ("Q In your letter, this salvage plan, you told the Coast Guard what would be done aboard the vessel to achieve the result that was intended, correct, to bring it to zero list and zero trim? A I told them what we were proposing, yes. Q Okay. And what you told them is that there would be cargo transferred from the Number 1 Center Cargo Tank to the Number 4 Center Cargo Tank, and that 7,600 barrels of ballast would be added to the Number 7 Starboard Wing Tank, is that right? A Yes, it is. Q And that's the plan you had developed, right? A Yes, it is. Q And you believed, based on what you had been told about the contents of the tanks of the vessel, that these two movements would take all of the heel off and remove all of the trim, isn't that right? A I believe so, yes. Q And that was based on your experience and judgment as a salvage master? A Well, it was based on my use of the ship's computer with the Chief Officer, recognizing the fact that the ship's computer could not handle the fact that there was some flood water in some of the tanks. THE COURT: But that paragraph also said that "These quantities will be adjusted as necessary..." (Pause.) BY MR. DeGIULIO: Q Your Honor has pointed out the last paragraph of this, for the record -- THE COURT: It's not a paragraph, it's a sentence. MR. DeGIULIO: -- I'm sorry, sentence. BY MR. DeGIULIO: Q "These quantities will be adjusted as necessary to reach the desired afloat condition." You said that in your letter, right? A Yes. Q Now, did you mean by that that the quantities on these two movements of liquids might be adjusted? A What I really meant was that -- and I think by using the words "approximately" and "roughly" liberally throughout this plan that we were making it up as we went along and we were going to make adjustments as necessary to reach the condition we wanted to. Q Now, this plan was actually executed the following day, on the 28th, right? A This exercise was undertaken. If we look at this plan and these particular numbers, I think something different was done. Q Right. And the ship actually did something quite different than what you told the Coast Guard would be done in your letter, right? A If we look at this and remove the -- remove "approximately" and "adjusted" and "roughly" and those issues, the plan was -- was I would say generally followed. We were looking to reach a certain afloat condition and that happened.")

<sup>63</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 30:19-31:6 ("Q And the vessel's obviously indicated that they brought the ship back to 0 degrees, so how could the ship have gotten back to 0 degrees as set forth in the cargo control room log if the ship had only been righted up to 5 degrees? A The 5-degree change in heel would have brought the ship from 7 or 8 up to 2 or 3, in order to get the ship upright would have required the discharge of an additional quantity of ballast between 400 to 600 tons. Q Is that ballast that you just testified about in addition to the 510 metric tons that were aboard -- reported to be aboard the vessel prior to the incident that you saw in the ballast water handling log, Defense Exhibit D-9? A Yes.")

<sup>64</sup> Trial Tr. Day 26, November 15, 2010, Petrie at 97:22-98:9 ("THE WITNESS: Thank you, sir. I have with me, a set of pages from Mr. Dr. Bowman's report and accompanying that set of pages, I have a tabular summary of the heeling moment calculations that are the basis of the 400 to 600 tons of additional ballast that I alluded to in my direct testimony. Q When did you prepare this document? A Yesterday. Q Can we have this document marked, please. Okay, for the record, I've marked the document that you've just handed to me as Plaintiff's Exhibit 1554. Do you have anything else with you that's related to this case, that hasn't been produced to date? A No, sir.")

<sup>65</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 27:3-18 ("Q Well, assuming the midships center line draft that you estimated to be 11.44 to 11.45, based on the new information, and the 7 degree list, and the drafts observed by Mr. Castillo, what would have been the minimum additional unreported ballast aboard the ATHOS I at the time of the incident? A Approximately 420 to 525 tons. Q And would that additional ballast be in addition to the 510 metric tons that's reflected on the ballast water handling log we looked at, which was D-9? A Yes. Q Now, assuming this minimum amount of ballast of -- unreported ballast of 420 to 525 metric tons, what would that have done to vessel's reported draft? A The midships center line draft would have been approximately 36 feet, 9 to 36 feet, 10 inches.")

<sup>66</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 98:16-20 ("Q Professor Petrie, you offered an opinion that the maximum draft of the ship, at the time of the incident, was between 36 feet, nine inches and 36 feet, ten inches, is that correct? A Yes.")

<sup>67</sup> Trial Tr. Day 33, December 1, 2010, Bowman, 71:7-76:10 ("Q Okay, now, did you form an opinion based on Mr. Petrie's new data, the data that he produced for the first time in this case, on the witness stand? Yes, I did. And does his new data support the conclusion that the arrival draft was 36 feet, nine inches or 36 feet, ten inches? A In my opinion, no. Q And why not? A When he did that calculation, he was adopting the TMC data, it's stated on the document. But he appears to have made an omission of one of the weights, which should have been considered. THE COURT: Admission or an omission? THE WITNESS: Omission, your Honor. THE COURT: Thank you. MR. LEVY: Could we look at Plaintiff's Exhibit 1554, please? THE COURT: Oh, heavens, of course we couldn't testify without seeing an exhibit. Q Is this the new data that Mr. Petrie produced for the first time, on the witness stand, when he was giving his opinion that the ship was drawing -- THE COURT: He wouldn't know when it was produced. The witness wouldn't know. MR. LEVY: He read his testimony, your Honor. THE COURT: Pardon? MR. LEVY: He read his testimony, your Honor. THE COURT: Well, that's nice, I guess. Q All right, according to Mr. Petrie's document, which this is, Plaintiff's Exhibit 1554, where is he obtaining his data from? A From the TMC calculation, that is, my calculation. Q Okay. Now, what about this data suggests to you that he omitted some important consideration? A On the left-hand side, where it's been highlighted in yellow, he has highlighted the transfers, which we have included in our calculation. But there's a further transfer that should have been all -- I should say, a further consideration of the amount of flood water in seven port, which is not shown in this table. When the vessel was brought upright, because there was a hole in the base or the bottom of seven port, as the vessel came upright from seven degrees or 6.6 degrees, we calculated. Then some of that water would have drained out to keep the level of the outside and inside water lines the same, which they have to be. And that amounts to about 185 tons should have drained out or did drain out and that is not reflected in this table. Q Why is that significant to Mr. Petrie's analysis of extra ballast being on board the ship after the accident? A Because if you include it, the effect of it, it would show that the vessel actually would not have changed the list by five degrees, it would have changed by around six degrees. Q Now, did you do a full calculation of the ship's arrival draft -- I'm sorry, arrival condition in your earlier reports? A Yes, I did. We did the calculation and it was contained in our report of the 16th of July, I believe, 2009. And we did a full calculation in our software program called SeaMaster, which is approved by all the classification societies and has been used for many years to do these types of calculations. And we find that carrying out these transfers, which was done on the 28th of November and including the change in flat water in seven port, the vessel comes up to an even keel, that is, with no list. Q Okay, so, when you did your calculation, you included a reduction in the flood water due to the fact that the ship was now brought to an even keel position? A That's correct and also, that level of floor water is recorded in the Unish (ph)[ullage] reports, which were taken -- which were prepared from the data they collected when they carried out the survey of the liquids on board the vessel, on the 29th and on the 28th. Q Now, did you see any analysis, by Mr. Petrie, showing a condition, a loading condition, that would correspond to this assessment of the heel caused by liquid movement on November 28, 2004? A No, I have not. Q But your loading condition, what did that show? A The loading condition we carried out from the data, on the 28th and 29th, showed the vessel was brought up to an even keel. Q Okay, in any event, Mr. Petrie concluded that if no additional ballast had been taken pre-arrival, other than that which was reported by the crew, the ship's

arrival draft would have been 36 feet, seven inches. Did you consider that testimony? A Yes. Q Now, did you find any evidence of any additional ballast on board after November 26, 2004, other than what was reported by the crew to have been taken earlier in that day? MR. DeGIULIO: Objection to form. THE COURT: Objection overruled. MR. LEVY: I'll rephrase the question. THE COURT: Go ahead. BY MR. LEVY: Q In your analysis of the issue of whether the ship's draft was 36 feet, seven inches on arrival or 36 feet, nine inches or ten inches, did you look for and determine whether there was any evidence of any additional ballast on board the ship after November 26th, other than, you know, the ballast that was reported to be on the ship? A I have not found any evidence from the documents I've reviewed, of additional ballast on the ship, other than the amount of ballast which was recorded in the documents in seven port -- seven starboard. Q Did you see any evidence of ballast having been removed from the vessel after the incident? So, after 9:02 p.m. on November 26, 2004 and before November 29, 2004, when there was a joint survey done by all the interested parties? A No. MR. DeGIULIO: Objection to form. THE COURT: It's a peculiar question. MR. DeGIULIO: Your Honor, the questions here imply that this witness had personal knowledge, was there and saw some evidence. THE COURT: Right. MR. DeGIULIO: And he's already testified he was never there and didn't see any of it. THE COURT: Exactly. Go ahead. MR. LEVY: Okay. BY MR. LEVY: Q I'm asking you about your review of the evidence you've seen in this case. A Right. Q The documents that you reviewed, the testimony that you reviewed. Have you seen any evidence of ballast having been removed from the vessel after the incident? A No, I have not.")

<sup>68</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-18:12 ("BY MR. O'CONNOR: Q Can you describe, Captain Bethel, what's going on here? A Yes. We're proceeding into the anchorage with a tugboat on each bow. We're turning the vessel to starboard, flood current setting us up river. I'm working the vessel ahead, I'm backing the tugs on the starboard bow and coming out on the port bow. We're starting to proceed towards the dock now, we're in the anchorage, still turning to starboard. Q Now, up to this point would you consider the maneuver that you were conducting to be routine? A Yes. Q Up to this point do you believe that the vessel had touched bottom or scraped bottom? A No. Q Okay. Are you able to offer an opinion as to the vessel's trim at a keel at this point? A Yes, she looks fine. She looks even keeled, she doesn't look like she's listing at her side to either side. Q What do you base that on? A The bridge deck lights. Q What about them leads you to think that the ship's on even keel? THE COURT: They seem fairly level. THE WITNESS: Horizontal, yes. BY MR. O'CONNOR: Q Okay. Let's continue, please. A Okay. I am still bursting over towards the dock, I'm releasing the tugboat on the port bow to come and put a line up on the starboard quarter, still turning to starboard. I want to get the vessel horizontal with the dock before I can breast it towards the dock because after you leave the anchors there's shoals above the dock and below. So you want to get the vessel's manifold lined up with the chick stands which are right here and you want to breast the ship straight in. Q That's so you avoid the shoals to the north and south of the dock? A Yes. And now we're starting to fall aft getting the ship in line but now the ship is starting to list. I'm easing the tugs off. Q And again your opinion that the ship is starting to list is based on you're pointing to the -- A The deck lights.")

<sup>69</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 18:7-12 ("Q We saw it on the video but can you just tell us when in the course of the maneuver did the ship take the list to port, was it when you start, the tug starting breasting her in? A It was after we got turned around, our bow was down river and we were midway or more so through the anchorage.")

<sup>70</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 19:20-23 ("Q All right, so did the list increase over time? A Yes, it did. Q What was the ultimate list? A About seven degrees.")

<sup>71</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, 34:2-35:11 ("Q Was the ship listing at all at this point?

A As we can see, no. It's -- it's -- Q Well, forget about this. From your memory standing there on the starboard bridge wing, was the ship listing at this point in time? A No, no, it's very easy to see the listing. There is no list during that time. It's very easy to see from bridge if you have even a small -- a small list of half degree. It's very, very easy to see, because you can see the lights -- THE COURT: No, but the question is: You were standing on the bridge, you can experience whether there was list or not quite easily; is that right? THE WITNESS: There was -- yes, I can see easily. THE COURT: Okay. Well, just listen to the question. THE WITNESS: I can see easily. BY MR. LEVY: Q Okay. A There is no list at that time, of course. Q Okay. And is there another tugboat alongside that we can't see in this video? A Yes, it's on the port side -- Q Forward. A -- forward, bow. Q On the bow. A And I don't -- I don't hear forward. We can see at this moment. Q Okay. MR. LEVY: Proceed. (The tape was played at this time.) THE WITNESS: Now, we start turning. (Pause.) From here, from the lights, we can see that there is not any list. As I can see from this video, the ship is even keel, and here show a few -- few seconds here's the tugboat.")

<sup>72</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7 (“Q And did you also take a look at the Citgo security video from the night of the accident -- and we will graciously not play it again -- and what did that security video show you? A All I could deduce from it was just before the accident, I believe it was about five minutes before 9:00 o'clock, the vessel was pretty much aimed onto the camera, and so you could see that the vessel did not at that point have a list.”)

<sup>73</sup> Trial Tr. Day 15, October 18, 2010, Markoutsis, at 33:3-11 (“Q Now, when the two tugs were perpendicular to the starboard side of your ship, pushing it within the anchorage, on the starboard side -- A Yes, sir. Q -- it pushed on the starboard side? A Yes, pushing from the starboard side to move to the port. Q And that's the point in time when you noticed the vessel starting to list a half of a degree, correct? A Yes, half a degree, yes, sir.”)

<sup>74</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 68:10-70:7 (“Q Was there anything unusual about the ship's maneuver to the berth? A Everything -- it was a normal operation of a vessel approaching the berth. Q When did you first learn that there was a problem? A Approaching -- approaching the dock, we had tied on two tugs; one aft and one forward. The ship was turning -- was turning 180 degrees. During the turn, and before completing the turn, I was at the bow looking at the ship aft, I realized that the ship was taking a list to the port, port side. At the same time I called the captain who was standing at the -- at the wing of the bridge, that I believed we have a small list, and trying to be funny I told him that I think the tugs are too powerful and they're going to capsize the ship.

Q Were the tugs on the starboard side pushing the ship towards the berth? A One was forward -- forward port and the other was aft starboard, starboard side, and they were assisting the ship to make the turn. Q Okay. What happened after you spoke with the captain? A I saw Captain Markoutsis go inside the bridge house. He saw the clinometer of the -- at the bridge, and at -- and at that time he realized that we were -- we had a list of two degrees to port side, and he called me on the radio to go aft and check out, verify, why we have this list. Q What did you do next? A I -- I passed on the command, the control onto the bosun, and I told him that I'm going aft, and you take over up at the bow, and I run back to the cargo control room. At the same time I called the pumpman who was at the manifolds, to go down -- down below in the pump room and check the pump room. Q When you got to the cargo control room, what did you see? A I saw the indicators of the cargo tanks, and the indicators of the ballast tanks. At that time, I saw that that the ullages on or the cargo Tank No. 7 center, the ullages were increasing, which meant that we were losing cargo from that tank. At the same time, from the ballast tank indicators, the No. -- the No. 7 port side ballast tank was increasing, the sounding was increasing. Q And what did that indicate? A It was indicating that something, water or cargo was going into the No. 7 port side. Q I'm sorry. Did you say that something was going into the No. 7 port side ballast tank? A Water or -- or fuel was going into that tank.”)

<sup>75</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 68:10-70:7<sup>75</sup>, 78:20-79:4 (“MR. LEVY: Okay. Using your pointer, can you point to what we're referring -- what you're referring to as the 7 port ballast tank? THE WITNESS: Yes, this one is the 7 port ballast tank. MR. LEVY: Okay. Now, is that the tank that was flooded with a hole in it?

THE WITNESS: Yes. MR. LEVY: And it was filling with water, oil? THE WITNESS: Yes, with water and oil.”)

<sup>76</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 75:2-77:2 (“MR. LEVY: When did you first measure the cargo that was in the tanks? THE WITNESS: Later on when the pumpman coming out from pump room, I order to take all the cargo and ballast tanks. MR. LEVY: Did you go with him? THE WITNESS: I'm going with him when he taking the cargo tanks, and after I leave him alone to continue taking also the ballast tanks. MR. LEVY: What was the state of the ballast tanks? THE WITNESS: We check and we found all the ballast tank that was empty except No. 7 port to have water and oil, and when he tried to check the No. 7 starboard, because of the vessel list, he told me that not possible to -- to checking by floater the ullage for this tank, No. 7 starboard. MR. LEVY: What time did you and the pumpmen check the ullages of the cargo tanks? THE WITNESS: I don't remember right now what time it was, but I believe after the vessel stop listing, and right after stopping the transfer of the cargo from No. 7 center to No. 4 forward center, and slop starboard. MR. LEVY: Did you prepare that evening, any kind of contemporaneous document to record what was happening in the cargo tanks and the ballast tanks? THE WITNESS: Yes, I'm preparing one -- I'm writing in one form the ullages from the cargo tanks, the ballast tank, and the condition of the vessel. MR. LEVY: The form that you were using, was that the discharge rate progress form? THE WITNESS: Yes, on that time I'm using this form. MR. LEVY: Okay. Could we put up on the screen P-481, ATHOS11073. Now, is this the discharge rate progress form that you completed on the evening of the accident? THE WITNESS: Yes. MR. LEVY: Okay. Could we just look at the top section, please, first. (Pause.) Okay. THE WITNESS: I see. MR. LEVY: Is this all in your handwriting, first? THE WITNESS: Yes. MR. LEVY: Okay. Now, the



times that are on there, are there local times, 22:30, 2200, and so on? THE WITNESS: Yes, that was local time. MR. LEVY: Okay. And the information that you have in the column that's marked 21:30, what does that information represent? THE WITNESS: This was the initial condition of the cargo and the ballast tanks.")

<sup>77</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 77:15-18 ("Okay. And what is this document showing by way of what ballast is in the ballast tanks? THE WITNESS: That the ballast tank was empty except No. 7 port and No. 7 starboard.")

<sup>78</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 78: 20-79:4 ("MR. LEVY: Okay. Using your pointer, can you point to what we're referring -- what you're referring to as the 7 port ballast tank? THE WITNESS: Yes, this one is the 7 port ballast tank. MR. LEVY: Okay. Now, is that the tank that was flooded with a hole in it? THE WITNESS: Yes. MR. LEVY: And it was filling with water, oil? THE WITNESS: Yes, with water and oil.")

<sup>79</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 81:16-25 ("MR. LEVY: Did you sound the ballast tanks after 2200 hours before 2400 hours? Do you see, you have the pumpman sounding the ballast tanks at 2200 hours, what about after that? THE WITNESS: Yes, continue sounding, but (indiscernible) is worst for No. 7 port and 7 starboard where we have the damage there (indiscernible) at 7 port, and No. 7 center cargo tank. MR. LEVY: No. 7 cargo. This one? THE WITNESS: Yes.")

<sup>80</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 83:4 to 84:9 ("MR. LEVY: Can we see, again, P-474, please, Athos 027462. BY MR. LEVY: Q I've previously shown you this document, the cargo tanks, water ballast tanks, and void spaces monitoring. MR. LEVY: Now, if we could pull up that bottom section that's in blue, please, and could we focus in on the time and the date here on the left. THE WITNESS: Okay. Here is the -- MR. LEVY: Yes. THE WITNESS: -- the date, 26 November, and 2400 hours. MR. LEVY: That's at midnight? THE WITNESS: Midnight. We have this sounding on direction, try to sound all the ballast tanks at midnight on November 26th, 2004? THE WITNESS: Yes, of course. MR. LEVY: And did he report to you that there was no ballast in any of the tanks except for 7 port, and that he couldn't take a sounding of 7 starboard? THE WITNESS: Yes. All the ballast tank was empty except -- except No. 7 port who gave me that ullage, and No. 7 starboard, which not possible to reach the ullage with the floater.").

<sup>81</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 44:6-45:22 ("Q All right. So then what did you do? What did you do to solve this problem? A Yeah, at the same time (indiscernible) from deck, I called chief officer and tell him that wing -- air coming out from 7 port, so we confirmed that something is going there, something going wrong, something is filling up the 7 port ballast tank. So they call the tugboat, the port tugboat called the pilot, the berth pilot, and told him that he saw oil in the water, and we was with the pilot (indiscernible), and we saw a fountain of oil coming out of the -- Q A fountain? A -- a fountain of oil. It was a huge quantity coming out of the water. Q You mean it was coming up from the water -- A Yes, sir. Q -- and fountaining right up out of the water? A Yes, because oil is more light than the water, and it gains speed as it comes out of the water, and it comes about to a half meter out of the water. So we have a pollution at that time. My thought was that we have a -- something has -- something happened, and we don't lose oil 7 center to 7 port, but also we lose oil to the sea. It's -- so luckily we have an empty tank for center, we have it empty, there is no cargo there. My first thought was to lower the cargo level of 7 center and bring it below the sea level in order to stop leaking. If you lower the -- the cargo level from the tank below sea level, then water will come out -- come in the tank. You stop the -- Q You would balance the hydrostatic pressure? A Yes, sir. Q Okay. A Yes, sir. Q And did you direct the chief mate to do that? A Yes, I told him to open both tanks, 7 center, port center. Q So that the cargo could flow from 7 center into port center -- A Yes, by gravity. Q -- by gravity? A By gravity, yes.").

<sup>82</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 72:6-74:3 ("Q Okay. On the night of the accident, when you saw the mercury rising in the ballast gauge on 7 port, as shown in this diagram, what did you do next? A The first thing I did was to report to the captain that we are missing cargo, losing cargo from No. 7 center, and something is going on and cargo is going to No. 7 port. At the same time I pushed the button and I opened or put on the hydraulic pump, and I run outside on the deck. I opened the hatch cover for No. 4 port just to see what's going on. At the same time on my face I got a blast of air and smelled fuel. Q Where did this blast of air come from? A From No. 7 ballast tank. I -- as I opened the hatch, the hatch cover of No. 4 -- THE WITNESS: No. 7 port. A -- No. 7 port, a blast of air hit -- hit me in the face. Q Okay. You said before you left the cargo control room you turned on the hydraulic pump. Why did you do that? THE INTERPRETER: Could you please repeat the question, sir? MR. LEVY: Before you left the cargo control room -- THE INTERPRETER: Okay. THE WITNESS: In order to use this pump, in case to open or close any valve on the left tank, to use immediately any opening or close of any valve on that tank. MR. LEVY: So in

order to operate any valves, either ballast valves or cargo valves in the tanks, you needed to have the hydraulic pump running? THE WITNESS: Yes, of course, must have pressure on the valves (sic) from hydraulic pump. BY MR. LEVY: Q Okay. After you got this blast of oil and smell of gas in your face, what -- THE COURT: He said blast of air. MR. LEVY: Blast of air in your face, what was happening with the ship at that time? THE WITNESS: I report again to Captain Markoutsis that really we lose cargo from No. 7 center and the cargo going to No. 7 port ballast tank. And Captain Markoutsis order me to start immediately transfer cargo from No. 7 center tank to No. 4 center tank, which was empty, and also to -- to stop starboard. MR. LEVY: Do these tanks share a common line? THE WITNESS: Yes, of course. This always tank was on the common line, so as soon I open the valve of this many times, immediately and very easy the cargo going there from No. 7 center, because they have -- because it was empty, and by gravity the cargo going there without using any pump. ").

<sup>83</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 17:20-18:4 ("THE COURT: Do you have any opinion as to what was causing it to list? THE WITNESS: Your Honor, I first thought that the tugs pushing one at full ahead and the other at one bell was causing the ship to list a little bit. I then eased the tugs off and the ship listed a little bit more and at that time I walked out to the very edge of the port side wind bridge, looked down and noticed oil in the water. THE COURT: On which side of the ship? THE WITNESS: The port side, your Honor. ")

<sup>84</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 17:20-18:4<sup>84</sup>, 88:10-24 ("Q When you first noticed that the ATHOS was listing in the anchorage both tugs were pushing against the starboard side, right? A Yes. Q And your first inclination was that the tugboats were causing the ship to list? A Yes. Q Do you agree based on your experience that it's not uncommon for a ship to list slightly if two tugboats are pushing against one side of the vessel together? A I thought it was odd. On tankers it would be a stretch but on a fruit ship or a lumber ship going into Beckett Street that you could cause that but I thought with the tractor tug and the bart, you know, one rung up and one bow, I thought that it was causing it at that time. ")

<sup>85</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 78:5-79:3 ("Q This is an e-mail that you sent to Mr. Levy on January 26th, 2005. MR. DeGIULIO: If we could show the highlighted section. BY MR. DeGIULIO: Q Here you tell Mr. Levy that "A relatively small variation in transverse distribution, about 200 tons, would give a list of about 1 degree. This would cause a draft increase on the extreme breadth of about 280 millimeters (11 inches)." Do you remember giving that opinion -- A Yes. Q -- to Mr. Levy? A Yes. Q And that's correct, isn't it? A Yes. Q Okay. And that's a relatively minor discrepancy in the quantities of liquids aboard a vessel where we're talking about 64,000 tons? A Well, the quantity is, but the degree listed, you know about a degree list. Q So if the ship had 200 tons of additional ballast on one side than was reported by the ship's crew, an increase in draft of 11 inches would result; isn't that correct? A At the extreme, the midship area of the vessel. ")

<sup>86</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 180:19-181:23 ("Are you familiar with certain phenomena that a vessel might exhibit if its keel is getting close to the bottom in shallow water? A Yes. Q Would vibration, excessive vibration be one? A Well, that's one possibility, where the balance of acceptable and excessive vibration lie depend on someone's determination. Q That might be the judgment of the ship's officers who are navigating officers that were familiar with how their ship behaves? A Well, they'd certainly have an opportunity to have an opinion. Q Sluggishness in steering, is that another? A That's a possibility, sometimes requiring more rudder than normal. Q Sometimes the RPMs have to increase for the vessel to maintain speed to make up for the lack of water that's being drawn by the propeller? A Well, I think I would have expressed that differently. It's possible that the RPMs could reduce, because of under-keel clearance -- lack of under-keel clearance. Q Do you know whether any of the phenomenon that we've just described were, according to testimony of the people on the bridge, were observed by anybody on the ship during the trip up the river? A I'm not aware that there was any documentation of those phenomenon. Q Do you know whether there was any testimony? A I'm not aware of any. ")

<sup>87</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 26:10-18 ("Q Was there anything unusual about the river passage on November 26th? (Pause.) A No, sir, it was a very small passage. Q Did you observe any vibrations or other signs that might indicate a problem with under keel clearance due to squat as the vessel came up the river? A No, sir, I don't -- I don't -- nobody on board noticed anything, any vibration or any -- it was a smooth passage. ")

<sup>88</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 27:2-15 ("Q What does the echo sounder show you as the river -- as the vessel is coming up the river? (Pause.) A It shows me that the clearance, the under keel clearance was enough. If I remember well, it was a minimum two 2 meters (noise). Q And did you have one of the duty officers assigned to do anything with respect to what the echo sounder was showing? (Pause.) A Yes, sir,

because it was night, and the echo sounder was located aft in the draft room, I don't have visual contact with the echo sounder, so I -- I tell to my officer to remain next to echo sounder, and call the under keel clearance every three to five minutes.")

<sup>89</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 28:10-30:1 ("Q Well, are you able to tell if a ship is experiencing squat, despite your expectation? A Yes, very easily. Q How? A Once we enter the restricted channel, the ship that's going to experience excessive squat will start to stress right away. Q Have you experienced that before on a ship? A Yes, on many large ships. THE COURT: Experience squat and what? THE WITNESS: Experience stress, vibrations, Captain. MR. O'CONNOR: Judge. THE WITNESS: Judge. MR. O'CONNOR: You're the captain, he's the Judge. Q Captain, I'm pointing to a circle that we've marked on the ship's navigation chart. Is that basically the entrance to the navigation channel? A Yes, it is. Q Okay and just for orientation purposes, what's the buoy that's on -- A Beacon Number 9, Brandywine range. THE COURT: (Inaudible). MR. O'CONNOR: Pardon? THE COURT: I'm asking him a question. What causes the vibration that you mentioned? THE WITNESS: On a ship, when the squat does become a factor and the keel may be getting too close to the bottom, the ship will start to vibrate. THE COURT: What causes it to vibrate? THE WITNESS: A lack of water and the wheel trying to pull more water out from under the ship. Q Were you able to determine, once the ship entered the navigational channel, whether or not squat was a problem with the Athos? A There was no indication of a vibration or anything. No loss of -- no increase in power, no temperature increase or anything. THE COURT: How did you answer that, yes, you were able to determine that and the answer is there was no problem. THE WITNESS: There was no problem.")

<sup>90</sup> Trial Tr. Day 2, September 22, 2010, Esplana, at 163:17 to 165:11 ("Q Did you return to the bridge for your evening watch that day, November 16th? A Yes, at 16:00. Q At 4:00 p.m.? A Yes. Q Whom did you relieve? A I replaced Second Officer Caro. Q Who else was on the bridge with you during this second watch? A The captain, the river pilot, the helmsman and one of the Coast Guards. Q Where was the Athos I when you returned to the bridge for your evening watch? A At the Delaware River. Q When you returned to the bridge for your evening watch, did you continue to put the position of the ship on the chart at five-minute intervals, like you showed us before? A Yes. Q And how -- while you were on the bridge for your evening watch, did the captain review the paper charts on which you were marking the ship's position? A Yes. Q And how frequently did the captain review the charts during your watch? A Frequently. Q Did you have any additional tasks to perform during this watch? A Yes. Q What additional tasks did you perform during your 4:00 to 8:00 watch in the evening on November 26th? A Other than plotting the positions every five minutes, I am also the general lookout and also I monitor the helmsman that they are following the piloting instructions. I also monitor the echo sounder and I relay the information to the captain and the pilot can hear what I am saying. Q What does the echo sounder tell you, generally? A This reads the distances from the keel of the vessel up to the seabed, that's what you would call the under-keel clearance. Q During your 4:00 to 8:00 watch, why did you call out the depths displayed on the echo sounder? A This would be at the back and the curtain is sort of covering it, most especially at night time, so, the captain and the pilot would not see it. So, it is needed after I have looked at it, I need to call it out to them. Q Okay, can we pull up a photograph, again, of the bridge, looking back over the chart table towards the echo sounder. Okay, using your pointer and show us the curtain and the echo sounder. A This would be the curtain and this the echo sounder is over there. Q Okay, either zoom in on the echo sounder or put up the photograph that we had up before of just the echo sounder. Okay, how does one read the depths on the echo sounder? A This is a digital readout, so, what I mean to say is the numbers come out in meters, that would be the under-keel clearance, which measures the keel of the ship up to the seabed and there is a marking. Q Okay, my question is simpler. What does the echo sounder display show? A It's a digital number. Q A number showing the under-keel clearance? A Yes. Q Okay and what was your routine, during your 4:00 to 8:00 watch, in which you would provide that information to the captain? Tell us what you would do. A After I had plotted the positions every five minutes, I would look at this and after I have looked at the number, I would call it out, I would tell the captain. I would move closer to him and I would tell him. Q Would you yell it out from behind the curtain? A No, I move closer to him and I tell him. Q Okay. Where are you standing when you plot the position or mark the position of the vessel on the charts? A I am towards the back, behind the curtain. Q Okay, where is the chart? A It's in the chart table. Q Okay. We've pulled up a picture of the bridge. Can you, again, explain your routine. Where you're walking, what you're doing to plot the position, to provide the echo sounder information to the captain and pilot and to do your other duties and still, at the same time, every five minutes, mark the charts?

*A Normally, as I look out, of course, I would need to use the binoculars and then I would look at the radar, the bearing and distance. I would then plot it on the charts. I would then look at the digital readings of the echo sounder. I would then approach the captain and tell him what it is. So, I could tell him the under-keel clearance.*

*Q Okay, was there anything unusual about the passage up the Delaware River, during your 4:00 to 8:00 watch?*

*A No. Q Did you have any concern about the depth under the ship's keel, at any point of the river passage, during your watch? A No. Q What did the echo sounder show when you were going around and looking at it during your 4:00 to 8:00 watch? A In all the time that I had my duties, it was showing an adequate amount of under-keel clearance. Q And what did you believe, at that time, was an adequate amount of under-keel clearance? A It's about three meters.")*

<sup>91</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 173:11-20 ("Q Captain, you haven't seen any evidence that indicates that there were any problems with the ship coming up the river until the point that it came in contact with that anchor, in terms of under-keel clearance or touching the bottom or going aground, did you? A I would say I've not seen any, any documentation that there were any problems. But given the lack of under-keel clearance, in this case, I would not have confidence that she might not have touched the bottom or slid through some mud along the way.")

<sup>92</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 163:11-165:8 ("Q Okay. I want to show you the British Admiralty Chart 2604. MR. LEVY: If we could put that up on the screen, please? That's P-461. And if we could zoom in on that -- yes, that section right there, and that little 38-foot mark there on the chart. BY MR. LEVY: Q At my request, did you examine what that 38-foot spot was in actuality in the Mantua Creek Anchorage? A Yes, I did.

*Q And what did you find? MR. CALDER: Your Honor, I don't believe this was included in his report unless I'm mistaking. COUNSEL: These are in. MR. CALDER: I'm sorry. THE COURT: I'll guess you'll just have to listen to his testimony then. MR. CALDER: Yes, sir. BY MR. LEVY: Q Mr. Capone, what did you find about the 38-foot spot? I'm sorry. Take a drink. (Pause.) A What I did was I got the position of that 38-foot spot and then I went and looked at the U.S. Army Corps of Engineers' multi-beam data. Q Which data was that? A Both from the 28th of November in 2004, and the 29th, to determine why that sounding was placed on the chart, and what I found was a cluster -- a small cluster of soundings between 38.9 and 38.8 feet. Q And how big a cluster of soundings was that --*

*A Other -- Q -- in diameter? A Other than one outlier, which was further in towards the anchorage proper, that cluster was in a circle of, you know, say 4 or 5 feet. THE COURT: I'm sure everybody else knows what he's talking about, but I don't. Is that 38 feet of water there or what? THE WITNESS: That is a 38-foot sounding on a chart.*

*To understand why it was placed on the chart, I looked at the -- the actual data from the U.S. Army Corps of Engineers, and the data that represents that 38-foot sounding is slightly more than 38 feet, and it's actually very small, but because of the way we place soundings on charts, we do it in a more conservative manner, so we use the -- NOAA uses the next full sounding. So if we had that sounding, as I had said, of 38.8 feet on the chart, we show it as 38.")*

<sup>93</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 164:21-165:9 ("THE COURT: I have one further stupid question. I have trouble understanding why you say the under-keel clearance was a negative number, when, in fact, the ship did travel up the channel and did not go aground. THE WITNESS: Well, I used the shallowest -- the shallowest of soundings within those quarters. Remember that each reach is divided into four quarters and for planning purposes, you can't know in advance which quarter you may need to navigate in due to traffic or other considerations. So, for planning purposes, you use the controlling depth as the coast pilot stipulated, of the shallowest depth that's within the channel limits for planning purposes. It doesn't mean you might not get lucky and be able to pass through some other quarter without grounding.")

<sup>94</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 210:23-211:4 ("Q And, but, in fact, there are a variety of formulae for predicting squats -- A There are. Q -- is that correct? A There are. Q And they may not predict the same squat? A Frequently they don't.")

<sup>95</sup> Trial Tr. Day 28, November 17, 2010, Daggett, at 20:11-24 ("Q Would you agree with me that the formula to predict squat, the formulas that you're relying upon, among other things, are by no means perfect?

*A No, they're not perfect. They're guides and that's one of the reasons that Barrass's formula is so well accepted is because it does provide a -- THE COURT: Just answer the question. Don't make speeches. THE WITNESS: Yes,*



sir. BY MS. HENNESSY: *Q* And your study, using yours and other scientists in this area, are developing calculations that will be more accurately predict squat? *A* Yes, there's current research going on to improve that.")

<sup>96</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 149:16-150:12 ("THE WITNESS: Well, first of all, the document they're referring to, this -- I think you said it's Exhibit 27 -- that is a voyage plan record that was being treated as a vessel -- by the vessel officers as a record of their voyage-planning activity. The problem that I have with what is described by the Coast Guard in their statement is, you know, you cannot calculate with any degree of practical certainty or in a practical sense, you cannot calculate squat. I mean, I know there's a lot of formulas out there and I know there's been tremendous discussion about the formulas, but you cannot calculate squat; it varies with ship speed, which you know, but it also varies with the configuration of the waterway. And everybody that -- every mariner I know that looks at this knows that these formulas are all over the map with their results and they overestimate typically, in most cases, what the squat is. So, in a practical sense, you can't really calculate squat. Now, that being said, I understand that they're talking about the voyage-plan record, which the ship's crew admits was a record, and -- but, you know, I don't know what they're doing here in this statement, what they're trying to accomplish.")

<sup>97</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 227:17-19 ("*Q* Okay. Now, the Barrass formula for predicting squat, it generally overestimates the amount of squat; isn't that correct? *A* It does. In some cases more so than others.")

<sup>98</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 212:22-213:14 ("Now, just so we're clear about something before we go on, the Barrass formula, and all the models for squat, recognize different types of waterways; is that correct? *A* Yes, there are -- some that apply to certain waterways and some apply to others. *Q* Right, so channels -- *A* Can make a difference. Some of them include -- *Q* -- open sea -- *A* a more definite definition of how this channel affects it, the squat, the more complicated apply. *Q* And, in particular, Barrass looks at -- and we saw this from the voyage plan form -- Barrass looks at both the open and the confined? *A* That's correct. *Q* And when you use open, or excuse me, when you use confined, as you described before, you're doubling the squat that the Barrass formula will predict? *A* When you use confined, that's his formula, yes, ma'am.")

<sup>99</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 215:15-216:12 ("*Q* Okay. In this STENA study that you did, did you use -- did you determine that the Barrass formula was the best formula to be used on the Delaware River? *A* It wasn't the one we selected to use as a primary formula to be used for calculating squat for that vessel. *Q* Right. In fact, didn't you say that it is not the formula that should be used in the study? *A* No. I think we actually said that the -- we found that for this particular vessel, and the transits that we measured, that the -- and the condition of the channel at that time, that the Barrass formula actually performed a very good prediction of the transit through at least portions of the day. However, it was the unconfined -- it was the unconfined calculation that was more accurate than the confined channel calculation. *Q* And did you recommend to Sunoco that they used Barrass or that they should use a different formula? *A* I think we recommended a different formula. *Q* All right. And you also recommended that you should not use the confined, you recommended that you should use the open? *A* That's correct --")

<sup>100</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 167:18-21 ("A Which is essentially the same as the draft, but actually deeper. This is, in fact, indicating that there is a negative under keel clearance, because when you subtract here the 12.30 from the 12.33, you would come up with a minus 0.3.")

<sup>101</sup> Trial Tr. Day 28, November 17, 2010, Daggett, at 17:8-14 ("*Q* So you used a speed of 10 knots throughout this journey; is that correct? *A* Yes, ma'am. *Q* And you found negative UKCs, as we can see in the second to the last row that's highlighted in yellow; is that correct? *A* That's correct")

<sup>102</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 213:15-17 ("*Q* Okay. And you use that formula because that's what Mr. Caro used? *A* That's correct.")

<sup>103</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 39:24-41:6 ("*Q* During your trip up the river, did you keep the ship in any particular part of the channel? *A* Mostly in the center of the channel. *Q* Why? *A* Deeper water, the ship rides better. *Q* Okay. Well, did you anticipate that you might encounter any vessels in passing situations during the trip? *A* There's always that anticipation. *Q* Did you have any advance knowledge about any vessels that might be down-bound that you would meet during your trip up the river? *A* One, for sure. *Q* How did you

know that? A I saw it on our sailing list. Q Okay. Are you able to communicate with pilots on other vessels while you -- A There's bridge to bridge communication open all the time. Q If, while you were piloting the Athos, you encountered a down-bound vessel, would that force you out to the starboard quarter of the channel? A No, we would just move appropriately over to just afford a proper distance to pass, that's all. Q Okay, I think you've testified that the Athos was just under 106 feet wide? A Yes. Q Okay, how wide is the channel? A 800 feet. Below ship lanes, you've got 1,000 feet. Above that, to the terminal, you've got 800 feet and on one occasions, you have 1,600 feet. Q Is there any problem with a ship the size of the Athos, if it meets a vessel in a passing situation, to stay in one of the center quadrants of the channel? A No problem.")

<sup>104</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis at 20:18-22:24 ("Q Okay. Now, before entering the Delaware River, did you review the navigational charts for the river? (Pause.) A Of course, the plan was ready. Q But did you review the charts -- A Yes, I review, of course. Q Okay. Now, did the charts have on them channel depth statements? (Pause.) A Yes, sir. Q And did the channel depth statements show that the channel was divided into quarters? MR. WHELAN: Objection, leading, your Honor. THE COURT: It certainly is. It's about time somebody did. Go ahead. MR. LEVY: Thank you, your Honor. THE WITNESS: Yes, divided in four quarters. BY MR. LEVY: Q And what did you see on the charts about the least depth in the center two quarters? (Pause.) A The two middle quarters are 40 feet less and sometimes 50 feet deep. Q Now, did you believe, based on your experience with sailing on the Delaware River, and your view of the charts of the river, that you would have sufficient under keel clearance bringing the ATHOS up the river when you did? MR. WHELAN: Objection, leading. THE COURT: It certainly is. Objection overruled. Go ahead. (Pause.) THE WITNESS: Yes, yes, sir. Yes, sir. BY MR. LEVY: Q Did any of the quarters of the channel have depths less than 40 feet? A Yes, the -- in some areas in the outer -- in the side quarters, in the outer quarters. Q Had depth less than 40 feet? A Yes, depths less than 40. Q And did you believe you would have sufficient room in the center two quarters of the channel, if you needed it, to pass another ship, or if an emergency came up? MR. WHELAN: Objection, leading. THE COURT: Objection overruled. (Pause.) THE WITNESS: Yes, the channel is wider -- the river is wider even and the channel is wide. BY MR. LEVY: Q How wide are some parts of the channel? A Minimum 800 feet. Q And how wide was the ship? A The ship is 100 plus something. It's 110 wide. Q Okay. A So there is a space of 400 feet for the two center quarters to proceed up the river, and in this 400 feet, this 400 feet is enough for two and three ships sometimes. There is no -- there's no problem with space, of space overall.")

<sup>105</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 27:2-15 ("Q What does the echo sounder show you as the river -- as the vessel is coming up the river? (Pause.) A It shows me that the clearance, the under keel clearance was enough. If I remember well, it was a minimum two 2 meters (noise). Q And did you have one of the duty officers assigned to do anything with respect to what the echo sounder was showing? (Pause.) A Yes, sir, because it was night, and the echo sounder was located aft in the draft room, I don't have visual contact with the echo sounder, so I -- I tell to my officer to remain next to echo sounder, and call the under keel clearance every three to five minutes.")

<sup>106</sup> Trial Tr. Day 15 October 15, 2010, Markoutsis at 39:23-40:8 ("Q And you were aware of this prior to your passage up the Delaware River, correct? A Of course. Q And when the ships pass up the Delaware River from the Pilot Station, typically they stay on the right side of the center line of the vessel -- of the river, correct? A On the center at right, yes, that's correct. Q To the right? A On the center of the channel and sometimes go to the -- it depends from the movement in the river. The Pilot is keeping the ship in the center of the channel, in the two quarters in the center, and sometimes he's using the left quarter when it's clear, sometimes he's using the right quarter. It depends from the movement, the ship's movement.")

<sup>107</sup> Trial Tr. Day 2, September 22, 2010, Wister, at 114:14-115:10 ("Q Did you review the Channel Statements that relate to the ranges in the Delaware River that are depicted on the British Admiralty chart? A Yes. Q Did you determine where the control depths were located in those ranges? A Yes -- Q Okay. A -- in the different quadrants, yes, I did. Q Okay. Can you give us an overview of what you found? A Well, for the most part, the shallowest depths that are indicated in the various quadrants are in the -- either the right-hand outside quadrant or the left-hand outside quadrant, meaning towards the edges of the channel. The majority of them were on the right side, in the right outside quadrants. THE COURT: How wide was the channel for the most part? THE WITNESS: It varied, your Honor. I think from 800 to 1600 feet, I seem to recall without looking at the notes there. BY MR. O'CONNOR: Q What's the width of the ATHOS? A The ATHOS is 106 feet wide. Q What's a safe passing distance between two ships that might meet in a river like the Delaware? A That depends on a number of factors. Typically, you could meet one beam width or maybe a beam width and a half of separation. (Discussion held off the record.) BY MR. O'CONNOR: Q Okay, Captain, we have here the -- MR. O'CONNOR: -- can we show the logger? Yeah, down in the lower --

yeah. (Pause.) MR. O'CONNOR: Okay, there you go. BY MR. O'CONNOR: Q This is the Army Corps survey for the Bulkhead -- Bulkhead Bar range for 2003, right? A Yes. Q Okay. A Yes. Q Now, do I understand it that the -- THE COURT: Talk into the microphone, please. MR. O'CONNOR: Yes, your Honor. BY MR. O'CONNOR: Q These are the channel lines? A Yes, that's my understanding. You can see the solid lines that demarcate the channel limits or the limits of the improved channel. Q And this particular channel, do I understand it as 1600 feet wide? A I believe it's 1600 feet wide in this location. Q And where -- generally speaking, if you can't pinpoint the precise number, can you just show the Court where the shallow depth, the control depth that appears on the chart came from? A Yes, sir. The shallowest depth shown on the Army Corps channel survey document is 36.4 feet, 36.4 feet. THE COURT: I think that the channel is running horizontally, is that -- THE WITNESS: Yes, sir. It's right here, it's right in this area here. BY MR. O'CONNOR: Q And that's at the outer edge of the starboard quadrant of Bulkhead Bar range? A Yes. This is the boundary right here, the channel boundary line, this is the channel boundary line on the other side. And this is traveling upriver, your Honor, this way. Q And does that dotted line down the middle represent the center line of the channel right there? A Uh... I'm not sure, looking at this. It's not exactly the center line, it's -- Q Close to it? A -- it's close to it in this area. I don't know that that's what it's intended to represent, but -- Q Can you approximate the distance that the 36.4 depth is from the middle of the channel in feet? A Well, it's right there. Q In feet? A It's -- you know, just by eyeball, I didn't get the dividers out and measure it, but if this is 800 feet out to here, it's probably about a hundred feet maybe, in that neighborhood. Q How far from the center line? A Probably about 700 feet from the center line.")

<sup>108</sup> Trial Tr. Day 34, December 2, 2010, Betz at 96:20-99:2. ("Q Now, in your estimation, would the up-bound Athos likely have to move all the way over to the -- let's say the starboard quadrant in Bulkhead range? A No. Q Okay. Who would be in the best position to determine whether it would be likely or unlikely that the Athos might have to make such a maneuver? A Well, that would be something that the Pilot would make that decision, he would be in the best position to know where to take the ship. Q And why would he be in the best position? A Because he's the one individual, the only individual that has in-depth knowledge, local knowledge about water depths, and he knows about the traffic on the river. Q What about a situation where the ATHOS might meet a down-bound vessel? Let's say, for example, in one of the bends in the Delaware River that the ATHOS encountered. A Well, you know, first of all, when a River Pilot departs from his Pilot station to conduct a job like this up the river, he's going to have a list of all the other anticipated ship traffic on the river. He gets that from his pilot service before he leaves, that's a very common practice. And all the Pilots on the other down-bound vessels are going to be -- are going to be his colleagues that are members of his pilot service and they communicate with each other. Not only does he know he's going to meet someone in advance, but they're talking on the river all the time on VHF radio and planning where they're going to meet. It's very similar on a river or in a harbor, we all do that. So -- and he's got other electronic devices like AIS, so he can tell where the other vessels are; he's got radar, he can tell where the other vessels are on the river. Q Do two oceangoing vessels typically meet at a bend in the river? A You know, not usually. Again, the two Pilots would plan that and they would plan a suitable meeting location. It's customary on any river like that to meet in the straightaways, you would try to avoid meeting on a bend. Some bends you could do it, it depends on the configuration of the turn in the river, but typically you would prefer to meet in a straightaway and that's what they'll typically arrange. Q Now, you've testified that you've handled Panamax-size ships many times in the past, right? A Yes. Q If a Panamax vessel needs to make a turn similar to the turns that you've seen on the chart of the Delaware River for the transit of the ATHOS, how far would you expect the stern to swing during a turn? Let's say a starboard turn, for example. A Well, of course that's always -- you know, looking at most of the turns, like the one that we looked at Bulkhead Bar there. It's not that big of a turn and the ship's stern is not going to swing out that much, maybe at most a half-a-beam width, probably not even that much, it just depends on how the Pilot executes the turn. You can execute a turn like that where there's hardly any swing, for lack of a better term at all.")

<sup>109</sup> Trial Day 12, October 12, 2010, Bowman at 38:19-40:4 ("Q So, Mr. Bowman, can you explain what we're seeing here and what you did to plot the GPS positions, or have somebody in your office plot the GPS positions over the Army Corps' surveys? A This is the sounding in the channels, all the depths in the channel, carried out by the Army Corps of Engineers. This is the plotted position. I can't quite read that, the time there, but this one would have been taken from the echo sounder. I know that because we gave the page number against the echo sounder, our copy that we printed off. And you can see it's well in the middle of the channel in deep water at that point. Q What's the depth of the water there, according to this survey? A Well, as far as I can see, it's about 59 feet there, 61 feet here. Q Okay. A This is another position here, and there's no page number against it, and this would have been from the master's GPS. Q Okay. And what did this show to you? A Well, it showed that the ship was generally in the middle

of the channel, and in deep water, and one of these crosses is between two lines of soundings, but the depth in the middle would be similar to each side of it, not greatly different. Q Okay. Now, did you do that for a whole series of Army Corps of Engineers' surveys at my request? A Yes, I did. MR. LEVY: And may we put up on the screen P-1409, please. BY MR. LEVY: Q Okay. And this is a document that has a series of pages to it. Does it list all the Army Corps of Engineers' surveys where your office plotted the vessel's track across those surveys? A Well, I certainly recognize the titles of them, yes.")

<sup>110</sup> Trial Tr. Day 2, September 22, 2010, Esplana, at 163:17 to 165:11 ("Q Did you return to the bridge for your evening watch that day, November 16th? A Yes, at 16:00. Q At 4:00 p.m.? A Yes. Q Whom did you relieve? A I replaced Second Officer Caro. Q Who else was on the bridge with you during this second watch? A The captain, the river pilot, the helmsman and one of the Coast Guards. Q Where was the Athos I when you returned to the bridge for your evening watch? A At the Delaware River. Q When you returned to the bridge for your evening watch, did you continue to put the position of the ship on the chart at five-minute intervals, like you showed us before? A Yes. Q And how -- while you were on the bridge for your evening watch, did the captain review the paper charts on which you were marking the ship's position? A Yes. Q And how frequently did the captain review the charts during your watch? A Frequently. Q Did you have any additional tasks to perform during this watch? A Yes. Q What additional tasks did you perform during your 4:00 to 8:00 watch in the evening on November 26th? A Other than plotting the positions every five minutes, I am also the general lookout and also I monitor the helmsman that they are following the piloting instructions. I also monitor the echo sounder and I relay the information to the captain and the pilot can hear what I am saying. Q What does the echo sounder tell you, generally? A This reads the distances from the keel of the vessel up to the seabed, that's what you would call the under-keel clearance. Q During your 4:00 to 8:00 watch, why did you call out the depths displayed on the echo sounder? A This would be at the back and the curtain is sort of covering it, most especially at night time, so, the captain and the pilot would not see it. So, it is needed after I have looked at it, I need to call it out to them. Q Okay, can we pull up a photograph, again, of the bridge,

looking back over the chart table towards the echo sounder. Okay, using your pointer and show us the curtain and the echo sounder. A This would be the curtain and this the echo sounder is over there. Q Okay, either zoom in on the echo sounder or put up the photograph that we had up before of just the echo sounder. Okay, how does one read the depths on the echo sounder? A This is a digital readout, so, what I mean to say is the numbers come out in meters, that would be the under-keel clearance, which measures the keel of the ship up to the seabed and there is a marking. Q Okay, my question is simpler. What does the echo sounder display show? A It's a digital number. Q A number showing the under-keel clearance? A Yes. Q Okay and what was your routine, during your 4:00 to 8:00

watch, in which you would provide that information to the captain? Tell us what you would do. A After I had plotted the positions every five minutes, I would look at this and after I have looked at the number, I would call it out, I would tell the captain. I would move closer to him and I would tell him. Q Would you yell it out from behind the curtain? A No, I move closer to him and I tell him. Q Okay. Where are you standing when you plot the position or mark the position of the vessel on the charts? A I am towards the back, behind the curtain. Q Okay, where is the chart? A It's in the chart table. Q Okay. We've pulled up a picture of the bridge. Can you, again, explain your routine. Where you're walking, what you're doing to plot the position, to provide the echo sounder information to the captain and pilot and to do your other duties and still, at the same time, every five minutes, mark the charts?

A Normally, as I look out, of course, I would need to use the binoculars and then I would look at the radar, the bearing and distance. I would then plot it on the charts. I would then look at the digital readings of the echo sounder. I would then approach the captain and tell him what it is. So, I could tell him the under-keel clearance. Q Okay, was there anything unusual about the passage up the Delaware River, during your 4:00 to 8:00 watch? A No. Q Did you have any concern about the depth under the ship's keel, at any point of the river passage, during your watch? A No. Q What did the echo sounder show when you were going around and looking at it during your 4:00 to 8:00 watch? A In all the time that I had my duties, it was showing an adequate amount of under-keel clearance. Q And what did you believe, at that time, was an adequate amount of under-keel clearance? A It's about three meters.")

<sup>111</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 92:3-15 ("THE COURT: How wide was the channel for the most part? THE WITNESS: It varied, your Honor. I think from 800 to 1600 feet, I seem to recall without looking at the notes there. BY MR. O'CONNOR: Q What's the width of the ATHOS? A The ATHOS is 106 feet wide. Q What's a safe passing distance between two ships that might meet in a river like the Delaware? A That depends on a number of factors. Typically, you could meet one beam width or maybe a beam width and a half of separation.")



<sup>112</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 96:12-99:2 (“Q Now, where we left off just before lunch, we were discussing your examination of the Army Corps channel statements and where you located the lowest depths, do you remember that? THE COURT: Yes, we all remember it. THE WITNESS: Yes. MR. O’CONNOR: We all do, okay. BY MR. O’CONNOR: Q Now, in your estimation, would the up-bound ATHOS likely have to move all the way over to the extreme edge of the -- let’s say the starboard quadrant in Bulkhead Bay? A No. Q Okay. Who would be in the best position to determine whether it would be likely or unlikely that the ATHOS might have to make such a maneuver? A Well, that would be something that the Pilot would make that decision, he would be in the best position to know where to take the ship. Q And why would he be in the best position? A Because he’s the one individual, the only individual that really has in-depth knowledge, local knowledge about water depths, and he knows about traffic on the river. Q What about a situation where the ATHOS might meet a down-bound vessel? Let’s say, for example, in one of the bends in the Delaware River that the ATHOS encountered. A Well, you know, first of all, when a River Pilot departs from his Pilot station to conduct a job like this up the river, he’s going to have a list of all the other anticipated ship traffic on the river. He gets that from his pilot service before he leaves, that’s a very common practice. And all the Pilots on the other down-bound vessels are going to be -- are going to be his colleagues that are members of his pilot service and they communicate with each other. Not only does he know he’s going to meet someone in advance, but they’re talking on the river all the time on VHF radio and planning where they’re going to meet. It’s very similar on a river or in a harbor, we all do that. So -- and he’s got other electronic devices like AIS, so he can tell where the other vessels are; he’s got radar, he can tell where the other vessels are on the river. Q Do two oceangoing vessels typically meet at a bend in the river? A You know, not usually. Again, the two Pilots would plan that and they would plan a suitable meeting location. It’s customary on any river like that to meet in the straightaways, you would try to avoid meeting on a bend. Some bends you could do it, it depends on the configuration of the turn in the river, but typically you would prefer to meet in a straightaway and that’s what they’ll typically arrange. Q Now, you’ve testified that you’ve handled Panamax-size ships many times in the past, right? A Yes. Q If a Panamax vessel needs to make a turn similar to the turns that you’ve seen on the chart of the Delaware River for the transit of the ATHOS, how far would you expect the stern to swing during a turn? Let’s say a starboard turn, for example. A Well, of course that’s always -- you know, looking at most of the turns, like the one that we looked at Bulkhead Bar there. It’s not that big of a turn and the ship’s stern is not going to swing out that much, maybe at most a half-a- beam width, probably not even that much, it just depends on how the Pilot executes the turn. You can execute a turn like that where there’s hardly any swing, for lack of a better term at all.”)

<sup>113</sup> Trial Tr. Day 2, September 22, 2010, Wister, at 114:14-115:10 (“Q Did you hear anyone speak while you were on the bridge, beside the master and the pilot? A There was another person who was calling out draft readings. Q Draft readings or depths? A Depths, soundings. Q Oh, okay. So and what was your understanding of the soundings that he was giving, the amount of water underneath the vessel, is that correct? A Correct. THE COURT: Well, were the soundings expressed in feet of the depth of the water or the amount below the keel? THE WITNESS: I believe they were expressed in the amount of water underneath the keel. Q Do you recall the ship’s destination? A It was the Citgo dock in Paulsboro. Q And on the two times you were up on the bridge, how long did each one of them last? A About an hour, about an hour. Q Okay and were the soundings that you heard being repeated throughout those times on the bridge? A Yes, both times they were.”)

<sup>114</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 229:5-17 (“Q And would you agree, however, that the local knowledge of a pilot allows him, in this case Pilot Teal, to make these kinds of decisions about speed, and that’s the reason why pilotage and local knowledge are irreplaceable in the safe handling of vessels, regardless of changing technology? A It’s generally true, but as I understand the regulation, and their own guidance, the master is still responsible for his ship, and he’s supposed to discuss with the pilot his plans, and they are supposed to make an informed decision. In this case, I see that it is master -- if he had calculated these before his sailing, he should have had a knowledge that he was going to be going through these critical areas with a minimum of under keel clearance, and a maximum risk.”)

<sup>115</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 169:16-170:2 (“Q And based upon your review of the testimony, what was the docking pilot’s understanding of the controlling depth of the anchorage? A I understand the docking pilot testified that he considered 37 feet to be the controlling depth in the anchorage. Q And based upon that assumption and the state of the tide and assuming zero squat and no dynamic forces being placed on the vessel by the tugs, what would the under-keel clearance be with a reported draft of 36.6? A Well, looking at just the draft and that depth, it would imply a six-inch under-keel clearance.”)

<sup>116</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 81:2-82:9 ("Q And on this channel statement there are depths given for each of the four Federal anchorages in the river, right? A Yes. Q And is that something you reviewed as a docking pilot prior to your work on the ATHOS? A Yes. MR. DeGIULIO: If you could highlight the Mantua Creek in yellow, please? BY MR. DeGIULIO: Q This is the Federal anchorage No. 9, right? A Yes. Q Federal Martin Mantua Creek. This channel statement was published in January 2004. Do you see the numbers in the right-hand three columns? A Yes. Q 37, 4, 36, 40.4? A Yes. Q What information does that convey to you as a docking pilot? A Certain soundings in the anchorage. Q Okay. So this channel statement from the Army Corps showed depths of 37.4 feet, 36 feet and 40.4 feet, correct? A Yes. Q Had you looked at this channel statement before you boarded the ATHOS? A I've seen it. Q So you were aware that there were depths of 36 feet in the Federal anchorage according to the Army Corps of Engineers? A Yes. Q Did you take that into account when you took the ATHOS into the Federal anchorage on November 26th? A No.")

<sup>117</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 95:4-12 ("Q You were asked a couple of questions about channel statements and shown some depths in the Mantua Creek anchorage 36, 37 foot depths, where are they in the anchorage? A The northern end of the anchorage where the tug and barges anchor up off of the Amer (ph.) dock. Q When you berth a ship at Citgo do you have any reason to go into those areas at the northern end of the anchorage? A No.")

<sup>118</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 102:14-103:2 ("Q Okay. And are there depths that are less than 40 feet in this survey of the Mantua Creek anchorage? A Yes. Q And generally, where are they in the anchorage? A Principally, up in this northern part, there a -- that's the 40-foot contour and everything within that is shallower than 40 feet. Q All right, can we back back out of this? A There are a couple other spots up here, one there and one there, they're just one -- I think they might be just one reading or two readings that are less than 40 feet. Q And how close -- is this area anywhere near the Citgo terminal? A No.")

<sup>119</sup> Trial Tr. Day 31, November 23, 2010, Stoller, at 89:13-17 ("THE WITNESS: There we go. Let's look at 20:50 -- I'm sorry, 20:49, 20:49. Okay, the heading is the same. 20:50, the heading is the same. The ship moves lateral, their Echo Sounder shows 0 UKC. They went over that 38-foot spot, they touched bottom, they came over the hump.")

<sup>120</sup> Trial Tr. Day 31, November 23, 2010, Stoller, at 111:14-18 ("Q Mr. Stoller, the opinion that you gave here this morning that the ship touched bottom on the 38-foot spot, would you agree with me that that's a new opinion that wasn't contained in your report? A Correct.")

<sup>121</sup> Trial Tr. Day 31, November 23, 2010, Stoller, at 88:3-16 ("Q And how about the next position that we have here? And can we highlight that and what does that tell you? A Well, that next position makes sense, your Honor. You're talking about a rudder and there's testimony and the video of them backing down with a tug on the port bow, backing down with a tug on the starboard bow, which as a Pilot you're slowing the vessel down. There's evidence of using the engine to go dead-slow astern and then half astern. And this vessel is a single-screw, right-hand-turning vessel and she backs to port. That's a whole different animal. She's backing to port, the actions that have been taken, she's starting to swing. She initially uses the tug on the port bow and the starboard bow to slow her down. Totally different than these other two positions.")

<sup>122</sup> Trial Tr. Day 31, November 23, 2010, Stoller, at 89:13-25 ("THE WITNESS: There we go. Let's look at 20:50 -- I'm sorry, 20:49, 20:49. Okay, the heading is the same. 20:50, the heading is the same. The ship moves lateral, their Echo Sounder shows 0 UKC. They went over that 38-foot spot, they touched bottom, they came over the hump. Let's go to 20:51. 20:51, it's not showing 0 UKC. At 20:51, there is some clearance on their Echo Sounder. At 20:51, the vessel is backing with a single-screw, right-hand-turning propeller, she backs to port. She's got a tug on the port bow backing, she's got a tug on the starboard bow backing, it's in the video. She's slowing down, she's using her engine to assist the turn. And that's in the testimony of the Docking Master")

<sup>123</sup> Trial Tr. Day 33, December 1, 2010, Bowman, at 61:22-65:8 ("Q Okay. Now, Mr. Stoller stated that he relied, in part, on the echo sounder trace recording for November 26, 2004, at around 2050. Did you consider that testimony and the echo sounder trace recording in your analysis of whether the ship touched bottom, at that time? A Yes, I did. Q And what did you conclude, if anything? A Well, in my opinion, that blip, if you like, on the echo sounder printout, is simply the cavitation or extreme turbulence that would be created when the propeller was, for

example, going astern, as the vessel was approaching the anchorage. Q What do you know about cavitation? A Well, when the propeller is turning in the water, it can generate air bubbles or gas bubbles, more appropriately and they form a cluster and are directed under the vessel, when the vessel is moving astern. It doesn't always happen. THE COURT: Why do you say gas bubbles is more appropriate than air bubbles? THE WITNESS: Well, I believe the -- it's such a high drop in pressure, that the water vaporizes and causes a gas. That's all I know of cavitation. THE COURT: Causes what gas? THE WITNESS: Well, it is -- well, that's my extent of my knowledge of it in Naval architecture, your Honor, I'm sorry. I just know it's created. Q You just know cavitation is created by -- A Yes, it's a gas, yes. Q -- turbulence or air bubbles that go under a ship? A Yes. Q And what exactly is cavitation? What does it do with respect to a transducer that's trying to read the depth to the bottom of the ship -- or bottom of the river? A Well, it could give a false reading by interfering with the echo that's coming back from the bottom of the river bed and give a false echo. Q Now, did you look at the engine logbook to see whether there were any astern movements of the ship at around 2050? A Yes, I did. Q Okay, before we do that, let's look at Tab 7, which is P-464-A. This is the section of the echo sounder printout that Mr. Stoller said that he was relying, in part, upon in forming his opinion that the ship went aground at the 38-foot charted location in the Mantua Creek anchorage. Do you recall that testimony? A Yes, I do. Q Okay. And at your direction, did we write on this, echo sounder cavitation at about 2050, on November 26th? A Yes, I did. Q And what is the -- can we zoom in, yes, thank you, Ted. What is the under-keel clearance that the echo sounder is showing both before and after this cavitation event? A It's just over two meters, that's a two-meter line on the scale of this printout. Q Now, if we could look at the engine logbook please, at P-372, ATHOS page 0058. Now, here, if you could just pull up the left-hand page, please. And your Honor, you'll see this at Tab 8 in your book. Mr. Bowman, is this the engine logbook for the ATHOS I for November 26, 2004? A The engine movement book, more accurately, I call it. Q Thank you, the engine movement book. And does this engine movement book show that -- record that there were two astern movements at around 2050? A Yes, it does. You can see here the column showing where the astern movements are recorded and you can see, under the heading, Slow, if you come down, it's 2050. And then under the heading, Half, if you come down, 2050. So, there were two movements in at about that time, the engine astern. Q What does that mean, that you have engine movement astern? A Well, it means the engine was turning astern, so the propeller was turning in the reverse direction to going ahead. Q Okay and as it's turning or it's moving astern, the ship is -- sorry -- the propeller is moving so that the ship will move astern. THE COURT: Eventually, but it comes to a stop first. Q Eventually. Initially, it slows the ship down? A It's slowing the ship down, yes. Q Yes. A At that time. Q And we saw that on one of your earlier exhibits that the ship was slowing down at that time? A Yes, that's correct. Q And is that what can cause cavitation? A It's one of the times that cavitation can be caused, yes.")

<sup>124</sup> Trial Tr. Day 34, December 2, 2010, Betz at 80:18-83:12 ("Q Did you review the Echo Sounder printout in this case? A Yes. Q Did you note that there were certain times where it appeared that there was interference or there was no under-keel clearance reading? A I noticed times when there was -- it appeared that there was some interference or it could look like a zero reading, yes. Q Did you compare the times that you noted when this phenomenon exhibited itself on the Echo Sounder trace, did you compare the times with the times on the BA chart to determine the location of the ship when these --MR. CALDER: Objection, your Honor, there's no evidence that this is an expert on Echo Sounders. THE COURT: We're about to find out. MR. CALDER: Yes, sir. THE COURT: Go ahead. BY MR. O'CONNOR: Q Did you compare the times? A Yes, I did. Q Did you compare the times in the Bell book? A Yes. Q Do you have an explanation as to why the Echo Sounder showed no clearance? A Yes. Q What is it? A Well, first I looked at the Bell book and compared that to a number of the events. And I can't recall exactly, it was three or four events up near the time of arrival in Paulsboro when they were slowing down, and every one of those events coincided with when the engines were being run astern and -- Q What significance does an astern maneuver of the prop have on the Echo Sounder? A Well, what happens is -- and I used to experience this on my own vessels fairly regularly -- when you run a ship's engine astern, its propeller is pushing water up under the hull and at some point that water will run up the length of the hull. It will also pick up sediments, there will be air bubbles entrained in that wash, and when the transducer, which is located on the bottom of the hull, detects those air bubbles and the sediment stream, it's getting a reflection or a return, if you want to call it, it sends a sound wave that comes back, it's detecting that something is there and all it is is the wash from the propeller, and it shows -- it interferes with the normal reading. It's not a malfunction of the equipment, it's actually showing that the equipment is working fairly well. Q Now, you also said that you compared some of the times on the Echo Sounder with times in the ship's Bell book? A Yes -- or -- yes, that's what I just said, in the Bell book, right. Q Did you reach any conclusions after you did that comparison? A Yes, that they were running the engine astern. Q I'm sorry. Did you also compare it with the chart, the times in the chart? A Yes. Q Okay. You say the Bell book explained three or four

of the instances where the UKC appeared to show no reading, what about the other occasions? A There were other occasions that it showed there was some sort of an interference. And in all those cases when I looked at the chart, the ship was passing by an area of the river where there was a side canal or an outflow coming into the river. And an outflow like that in a river system can cause the same phenomenon where sediment is churned up and it will interfere with the operation of the Echo Sounder – or it will interfere with the reading that the Echo Sounder is obtaining.”)

<sup>125</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 161:24-163:4 (“Q Okay. Do you see this area of the echo sounder printout where it appears that there may be no under keel clearance for the vessel? A Yes, I do. Q And did that affect your opinions at all in this case? A No, it did not.”)

<sup>126</sup> Trial Tr. Day 18, October 21, 2010, Bolton, at 96:17-97:11 (“Q Is it your opinion that even though the fathometer, echo sounder shows 0 UKC, there are circumstances where no alarm will sound? A I don't know what the alarm setting was set on on the ship, but the alarm, as far as the people on – being concerned about the people on the ship, is that what you're referring to? Q Yes A Okay. It depends on the circumstances. For example, if they're traversing up the Delaware River, any time a ship passes, or you get an excess -- it goes into suspension, and that will cause a fathometer to go to 0 momentarily. Q That's not my question. My question was -- THE COURT: Well, let him finish his answer. Don't interrupt. THE WITNESS: And so that's not a concern. I note that at the point where she's started to maneuver, and the tugboats were around here, or when the engine went astern, the mud goes into suspension and that causes the fathometer to show a 0 reading, so that's not a concern.”)

<sup>127</sup> Trial Tr. Day 33, December 1, 2010, Bowman, at 63:11-25 (“Q Okay, before we do that, let's look at Tab 7, which is P-464-A. This is the section of the echo sounder printout that Mr. Stoller said that he was relying, in part, upon in forming his opinion that the ship went aground at the 38-foot charted location in the Mantua Creek anchorage. Do you recall that testimony? A Yes, I do. Q Okay. And at your direction, did we write on this, echo sounder cavitation at about 2050, on November 26th? A Yes, I did. Q And what is the -- can we zoom in, yes, thank you, Ted. What is the under-keel clearance that the echo sounder is showing both before and after this cavitation event? A It's just over two meters, that's a two-meter line on the scale of this printout.”)

<sup>128</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 140:17-141:3 (“THE COURT: In your opinion, how much difference in weight would it take to increase the ship's draft by one inch? THE WITNESS: Approximate -- well, one centimeter is about 64 -- BY MR. LEVY: Q 64 what? A Tons, and so it's two and a half times that for one inch. So, about 150 tons, I believe, yes. Q So, you have to add 150 tons to the ship to increase the ship's mean draft by one inch? A Correct.”)

<sup>129</sup> Trial Tr. Day 4, September 27, 2010, Zotos at 29:4-38:17 (“Q Did you undertake any deballasting operations, during the loading process? A Yes. Q And, approximately, when did you deballasting? A We started a few hours or at some point after commencement of loading. MR. LEVY: If we could put up on the screen the bridge logbook P-366 at ATHOS003949, the specific page. Okay. BY MR. LEVY: Q And if you could, just orient us for a second, Captain Zotos, is this a copy of the bridge logbook, a page of it? A Yes. Q And where was the ship at this time? A Puerto Miranda in Venezuela. Q And what's the date that's shown there? A November 18th, 2004. Q Okay. MR. LEVY: And if we could pull up the next highlighted section, please? Yes, that's fine. BY MR. LEVY: Q When did you commence deballasting of the ship on the 18th of November? A Commencement at 13:40 hours by gravity. Q And at some point did you also commence deballasting using the ballast pump? A At 22:05 we used the ballasting pump. Q Why were you deballasting or discharging ballast from the ship at this time? A This is how it's going -- this is how it should be. All the ballast has to be -- should be removed, the pumping out of the ballast, so that we can take on board as much cargo as possible. Q Did you use anything else to remove ballast from the ship besides deballasting by gravity and the ballast pump? A Yes, of course. At the end -- at the end we always use an eductor. Q The eductor? THE WITNESS: Yes. A At the end we always use an eductor which is driven by a fire pump in order to be able to strip well all the ballast tanks. Q And what piece of equipment drives the eductor? A It's a piece of equipment which -- which -- which using water from 25 suction, from the line, the ballast line, from all the tanks the fire pump. From the other side it has suction, from the line, the ballast line, from all the tanks of the ship. Q Okay. What piece of equipment is used to drive the eductor? A The fire pump from the engine room. Q I just want to make sure we're clear on the answer. Is it the fire and general service pump that drives the eductor? A Yes. Q And is that fire and general service pump located in the engine room? A Yes. Q And do the engineers in the engine room keep a logbook that would say, among other things, when the fire and service pump for the eductor was activated? A Yes, we call -- we communicate with the -- with the engineers every time we wish the pump to be put



on to strip -- in order to strip the ballast tanks, to strip the ballast from the tanks. Q Thank you. MR. LEVY: May we see P-370 at ATHOS027549. BY MR. LEVY: Q Captain Markoutsis, is this what we're showing here a page from the engine room logbook? A Yes. Q And if we could, what's the date of this page that we're showing? A 18-19, November 2004. Q Do the engine room log pages go from noon on one day to noon on the next day? A Yes. MR. LEVY: Now, if we could pull up the sections that we've highlighted here. Yes, that whole group. BY MR. LEVY: Q Do you see an entry at 22:20 hours? A Yes. Q You previously told us that the ship started deballasting by gravity and then deballast using the ballast turbine pump. A Yes. Q And what is shown here at this entry at 22:20 hours? A That deballasting continued. Q What does it -- (Witness speaking.) Q Excuse me. What is the entry that is at 22:20? A We started -- started deballasting pump at 22:20, and deballasting was continued by means of this pump. Q The entry for 22:20, what day is that? Is that the 18<sup>th</sup> or the 19<sup>th</sup> of November, 2004? A November 18<sup>th</sup>. Q Okay. Now, when we see the entries down a little bit further down on the list at 09:45 hours, 09:50 hours, could you read those entries for us, please? A Yes. THE WITNESS: At 09:45 hour, we stop the ballast pump turbine and secured it, and at 09:50 hours, we start the fire pump, the ballast eductor. BY MR. LEVY: Q And what does that indicate to you? A It means to me that at 09:45 hours, we stop the ballast pump and we continued stripping of the ballast tanks using -- using the ballast eductor. Q On what day are those entries for, the 045 -- 09:45 and 09:50? THE INTERPRETER: Would you please repeat. BY MR. LEVY: Q What's the date that's associated with the entries that are on 09:45 and 09:50? A Yes -- MR. LEVY: Captain Zotos, could you speak into the microphone, please? THE WITNESS: Yes, this is the next day of 19<sup>th</sup> of November, the next day (indiscernible). MR. LEVY: Okay. If we could turn then to the same exhibit, P-370, but ATHOS... I can't read my own writing here. We'll fill that in in a second. If we could go to the next page, ATHOS008158. you read those entries for us, please? A Yes. THE WITNESS: At 09:45 hour, we stop the ballast pump turbine and secured it, and at 09:50 hours, we start the fire pump, the ballast eductor. BY MR. LEVY: Q And what does that indicate to you? A It means to me that at 09:45 hours, we stop the ballast pump and we continued stripping of the ballast tanks using -- using the ballast eductor. Q On what day are those entries for, the 045 -- 09:45 and 09:50? THE INTERPRETER: Would you please repeat. BY MR. LEVY: Q What's the date that's associated with the entries that are on 09:45 and 09:50? A Yes -- MR. LEVY: Captain Zotos, could you speak into the microphone, please? THE WITNESS: Yes, this is the next day of 19<sup>th</sup> of November, the next day (indiscernible). MR. LEVY: Okay. If we could turn then to the same exhibit, P-370, but ATHOS... I can't read my own writing here. We'll fill that in in a second. If we could go to the next page, ATHOS008158. BY MR. LEVY: Q Are the top entries that we're seeing on this page of the engine room logbook are they for the date of November 19<sup>th</sup>? A Yes. MR. LEVY: Okay. Now, if we could look at the highlighted entry at 1400 hours, please? BY MR. LEVY: Q Is that entry at 1400 hours, is that on November 19<sup>th</sup>, 2004? A Yes. Q And what does that entry say? A That that 1400 hours, that the fire and the general service pump stopped. Q Okay. So is that the time the fire and general service pump was turned off? A Yes, the time that this two pump stop also indicates the time that the deballasting of the ship came to an end. MR. DeGIULIO: Your Honor, I'd like to interpose an objection here. THE COURT: If you'd really like to, why don't you interpose an objection. MR. DeGIULIO: There is no testimony here that this witness made any of these entries in this logbook. THE COURT: That's right. MR. DeGIULIO: He's interpreting the meaning of these entries. THE COURT: He certainly is, yes. MR. DeGIULIO: And we're objecting on that basis, your Honor. THE COURT: Well, that's not a basis for an objection, but the objection is overruled. However, we will recess for lunch at this point, and because of a judge's meeting we'll aim for 1:30 this afternoon, at which time I earnestly plead that somebody with a legal education, somebody in the courtroom explain what on earth any of this has to do with anything in this case. What are you trying to prove and why can't you prove it more rapidly than you are, in other words? We'll recess until 1:30. MR. LEVY: Thank you, your Honor. (A luncheon recess was taken from 12:21 o'clock p.m. until 1:52 o'clock p.m.) THE COURT: Mr. Levy. MR. LEVY: Good afternoon, your Honor. THE COURT: Proceed. MR. LEVY: Do you want an answer to your question at the end of the day? THE COURT: Yes, please. MR. LEVY: This goes to the issue of what the ship's draft was at the time of the accident. All of this goes to this, which is one of the crucial issues in the case. It affects whether the ship - THE COURT: It doesn't tell us anything about the draft of the ship. MR. LEVY: All of this does. The ballast, what

ballast is on board or not on board affects the ship's draft. THE COURT: The ship's draft is not something that you find written on a piece of paper. MR. LEVY: I understand what you're saying. There's a little bit more to it than that, but we are going to get to that physical part of it as well today. THE COURT: I hope soon. MR. LEVY: Thank you. Could we put up Exhibit P-366? THE COURT: Is it possible to get any information from any witnesses without first putting up something for him to read? MR. LEVY: Yes. THE COURT: This is ridiculous. Move on. Go ahead. MR. LEVY: If we could put up on the screen P-366 at ATHOS003951. BY MR. LEVY: Q And is this the bridge log from the 19th of November, 2004? A Yes. goes to this, which is one of the crucial issues in the case. It affects whether the ship -- THE COURT: It doesn't tell us anything about the draft of the ship. MR. LEVY: All of this does. The ballast, what ballast is on board or not on board affects the ship's draft. THE COURT: The ship's draft is not something that you find written on a piece of paper. MR. LEVY: I understand what you're saying. There's a little bit more to it than that, but we are going to get to that physical part of it as well today. THE COURT: I hope soon. MR. LEVY: Thank you. Could we put up Exhibit P-366? THE COURT: Is it possible to get any information from any witnesses without first putting up something for him to read? MR. LEVY: Yes. THE COURT: This is ridiculous. Move on. Go ahead. MR. LEVY: If we could put up on the screen P-366 at ATHOS003951. BY MR. LEVY: Q And is this the bridge log from the 19th of November, 2004? A Yes. goes to this, which is one of the crucial issues in the case. It affects whether the ship -- THE COURT: It doesn't tell us anything about the draft of the ship. MR. LEVY: All of this does. The ballast, what ballast is on board or not on board affects the ship's draft. THE COURT: The ship's draft is not something that you find written on a piece of paper. MR. LEVY: I understand what you're saying. There's a little bit more to it than that, but we are going to get to that physical part of it as well today. THE COURT: I hope soon. MR. LEVY: Thank you. Could we put up Exhibit P-366? THE COURT: Is it possible to get any information from any witnesses without first putting up something for him to read? MR. LEVY: Yes. THE COURT: This is ridiculous. Move on. Go ahead. MR. LEVY: If we could put up on the screen P-366 at ATHOS003951. BY MR. LEVY: Q And is this the bridge log from the 19th of November, 2004? A Yes. Q And when was ballasting completed -- deballasting, I'm sorry -- completed according to this log? A 1400 hours. Q Is that the same time that was shown in the engine room log for when the eductor was turned off? A Yes. Q When your ballasting operation -- deballasting operation was complete, approximately how much ballast did you still have on board the ship? A About 25 tons of unpumpable (ph) ballast. Q And for a ship the size of the ATHOS 1 -- MR. TADROS: That wasn't a complete answer. You need to let him finish, John. MR. LEVY: I'm sorry. I don't know Greek, so I thought he was finished. BY MR. LEVY: Q Go ahead, Mr. Nichols, if I cut you off, I apologize. A No, no, no. About 25 tons unpumpable quantity in all the tanks, ballast tanks. Q For a ship the size of ATHOS 1 how much is 25 metric tons of ballast in terms of the draft of the ship? A A lesser amount than half of one centimeter. Less of a half of one centimeter. (Witness speaking Greek.) THE INTERPRETER: Half, I said half a one, yeah. BY MR. LEVY: Q Thank you. THE COURT: Is this in fresh water or salt water? THE WITNESS: Fresh water. BY MR. LEVY: Q Was any independent confirmation made about the state of the ballast on the ship after you finished your deballasting operations? A What do you mean by "confirmation"? Q Did anyone look into the ballast tanks to determine whether there was any ballast in them after you had finished deballasting? A Yes, me, personally, and the cargo surveyor, after the completion of loading, and after the ullaging (ph) of the cargo tanks, we also checked the ballast tanks, which were empty.")

<sup>130</sup> Trial Tr. Day 4, September 27, 2010, Zotos at 50:17-23 ("Q Now, did you check the cargo and ballast tanks during the voyage to Paulsboro, quick the quantities that were in them? A Yes, of course. Q And why did you do that? A This is a daily, the first job that the pumpman will do. It's a -- it's a routine job for the pumpman every morning to check the cargo tanks and ballast tanks.")

<sup>131</sup> Trial Tr. Day 5, September 28, 2010, Zotos at 33:23-34:1 ("Q Nowhere on this form does -- do you indicate the duration of the ballasting operation on November 26th, is that right? A Yes, this is correct, there's no reference to it. But from what I remember the duration was less than 15 minutes.")

<sup>132</sup> Trial Tr. Day 5, September 28, 2010, Zotos at 37:15-38:8 ("Q In your deposition I asked you the following question: "Were any ballast tank soundings taken after the ballasting operation was completed?" Answer: "Yes, it was done." Question: "Who did that?" Answer: "The pump man. After that job was completed he went from the pump room up and myself I went out of the cargo control room and went together and sounded the two tanks." Question: "The two tanks being 7 port and 7 starboard, correct?" Answer: "Yes." Are you testifying today that tanks in addition to 7 port and starboard were sounded after you took the ballast on board on November 26th? A According to this deposition I was present of tanks No. 4 starboard and No. -- No. 7 port and No. 7 starboard.

And subsequently I returned into the cargo control room and the pump man continued sounding the remaining ballast tanks.”)

<sup>133</sup> Trial Tr. Day 5, September 28, 2010, Zotos at 38:9-15 (“Q And there are no written records of any of those soundings taken after the ballasting occurred, right? A No, there's no such record since all the remaining ballast tanks were empty. The only entry that was made was for No. 7 port and for No. 7 starboard in which we placed about 500 tons of ballast to bring the ship into an even keel condition.”)

<sup>134</sup> Figueros Dep. Designation, August 1, 2007, at 66:5-10 (“Q. Was there a normal procedure that required that the ballast tanks be sounded after the operation to bring ballast onto the vessel while the vessel was under way? A. After? Q. Yes. A. Yes.”)

<sup>135</sup> Trial Tr. Day 15, October 18, 2010, Markoutsis at 67:4-9 (“Q Okay. And when do you say that the ballasting was done? A I remember that we do the ballasting during the two-hours delay, we have to wait for the Pilot to board the vessel. And I remember that well because we make rounds and we have enough time at that moment to do this job. And I don't remember this time, 1330, to be correct.”)

<sup>136</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 54:21-22 (“Q And what day did you take on ballast? A November 26th before arrival at the pilot station.”)

<sup>137</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 63:17-20 (“MR. LEVY: How long did it take you to complete taking on this ballast that you took on on November 26th, the 500 tons? THE WITNESS: 15 minutes.”)

<sup>138</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18 (“Q What did you do when you got on the bridge? A Greeted the captain. Q Did you have a discussion with him? A Immediately. Q What did you talk about? A The condition of the ship and all systems, whether they're functional or not. And I asked his draft after that and he told me the fresh water draft would be 36 feet, six inches on arrival in fresh water and at the terminal.”)

<sup>139</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 75:2-77:2 (“MR. LEVY: When did you first measure the cargo that was in the tanks? THE WITNESS: Later on when the pumpman coming out from pump room, I order to take all the cargo and ballast tanks. MR. LEVY: Did you go with him? THE WITNESS: I'm going with him when he taking the cargo tanks, and after I leave him alone to continue taking also the ballast tanks. MR. LEVY: What was the state of the ballast tanks? THE WITNESS: We check and we found all the ballast tank that was empty except No. 7 port to have water and oil, and when he tried to check the No. 7 starboard, because of the vessel list, he told me that not possible to – to checking by floater the ullage for this tank, No. 7 starboard. MR. LEVY: What time did you and the pumpmen check the ullages of the cargo tanks? THE WITNESS: I don't remember right now what time it was, but I believe after the vessel stop listing, and right after stopping the transfer of the cargo from No. 7 center to No. 4 forward center, and slop starboard. MR. LEVY: Did you prepare that evening, any kind of contemporaneous document to record what was happening in the cargo tanks and the ballast tanks? THE WITNESS: Yes, I'm preparing one -- I'm writing in one form the ullages from the cargo tanks, the ballast tank, and the condition of the vessel. MR. LEVY: The form that you were using, was that the discharge rate progress form? THE WITNESS: Yes, on that time I'm using this form. MR. LEVY: Okay. Could we put up on the screen P-481, ATHOS11073. Now, is this the discharge rate progress form that you completed on the evening of the accident? THE WITNESS: Yes. MR. LEVY: Okay. Could we just look at the top section, please, first. (Pause.) Okay. THE WITNESS: I see. MR. LEVY: Is this all in your handwriting, first? THE WITNESS: Yes. MR. LEVY: Okay. Now, the times that are on there, are there local times, 22:30, 2200, and so on? THE WITNESS: Yes, that was local time. MR. LEVY: Okay. And the information that you have in the column that's marked 21:30, what does that information represent? THE WITNESS: This was the initial condition of the cargo and the ballast tanks.”)

<sup>140</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 77:15-18 (“Okay. And what is this document showing by way of what ballast is in the ballast tanks? THE WITNESS: That the ballast tank was empty except No. 7 port and No. 7 starboard.”)

<sup>141</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 81:16-25 (“MR. LEVY: Did you sound the ballast tanks after 2200 hours before 2400 hours? Do you see, you have the pumpman sounding the ballast tanks at 2200 hours, what about after that? THE WITNESS: Yes, continue sounding, but (indiscernible) is worst for No. 7 port and 7 starboard where we have the damage there (indiscernible) at 7 port, and No. 7 center cargo tank. MR. LEVY: No. 7 cargo. This one? THE WITNESS: Yes.”)



<sup>142</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 83:4 to 84:9 ("MR. LEVY: Can we see, again, P-474, please, Athos 027462. BY MR. LEVY: Q I've previously shown you this document, the cargo tanks, water ballast tanks, and void spaces monitoring. MR. LEVY: Now, if we could pull up that bottom section that's in blue, please, and could we focus in on the time and the date here on the left. THE WITNESS: Okay. Here is the -- MR. LEVY: Yes. THE WITNESS: -- the date, 26 November, and 2400 hours. MR. LEVY: That's at midnight? THE WITNESS: Midnight. We have this sounding on direction, try to sound all the ballast tanks at midnight on November 26th, 2004? THE WITNESS: Yes, of course. MR. LEVY: And did he report to you that there was no ballast in any of the tanks except for 7 port, and that he couldn't take a sounding of 7 starboard? THE WITNESS: Yes. All the ballast tank was empty except -- except No. 7 port who gave me that ullage, and No. 7 starboard, which not possible to reach the ullage with the floater.").

<sup>143</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 171:19-172:23 ("MR. BERGERE: Can we have P-416? (Pause.) BY MR. BERGERE: Q Do you recognize this document? A Yes, this was the chief mate's first ullage sheet that he produced after the incident. Q And an ullage sheet is intended to record what? A Ship's quantities of cargo. Q Okay. THE COURT: By measuring the space above the cargo and the tank? THE WITNESS: Correct, your Honor. The ullage is the space above the -- between the oil and the deck head. BY MR. BERGERE: Q And ultimately this kind of -- this is the kind of information that's important to you when you're attempting to calculate later cargo loss? A Yes, it's very important. Q Now, did you specifically discuss with Captain Zotos the -- or he's now Captain Zotos -- Chief Mate Zotos, the condition of the ballast tanks and when ballast soundings were being taken? A Yes, I did. He told me that they kept taking ballast tank soundings at all spaces on the ship. It's -- all ships screws are trained in the event of a grounding to keep sounding tanks until you're certain the situation is stable. Q Okay. And what's the purpose of that? A To make sure that the ship's structure is not cracking, to find out if liquids might be migrating through cracks, leading valves, broken couplings on pipelines." )

<sup>144</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 175:7-176:1 ("Q Now, you also mentioned that you had asked to accompany one of the mates when they did their next round of soundings. Did you do that? A Yes, I did. Q Okay. And can you explain what you did on that occasion? A I witnessed the crew member who had been designated to take soundings. It was probably the pumpman or the boatswain, I don't remember at this point in time, but I went around with them as they sounded the tanks, the ballast tanks. And in some cases we were looking through hatches in the tanks to make sure there was nothing in the tank, but generally it was done with a sounding rod. Q And were you able to confirm that the mate or the ship's crewman who was doing those soundings was competent at that task? A Yes. Q And were you able to confirm that all of the ballast tanks that you had looked at, that reported was empty, were, in fact, empty? A They were empty, yes." )

<sup>145</sup> Trial Tr. Day 10, October 6, 2010, Hall, at 185:6-188:2 ("Q Okay. So what was your next recommendation to the crew in an effort to assist you in coming up with calculations of cargo losses? A I recommended that a joint survey be done. Q And what's a joint survey? A A joint survey is where cargo inspectors representing interested parties meet on board and perform a survey together, so one company might be representing cargo interests, and the other company might be representing the ship's interests. Q And was a joint inspection, in fact, conducted? A Yes. Q And when was that done? A It was carried out on November the 29th. Q Okay. And who was involved in that joint inspection? A The BSI inspector that came on board for Citgo and we had Caleb Brett on board. Q For the vessel owners? A For the vessel owners. Q Okay. Now, so what is going to be measured in the joint survey? A All the cargo liquids, and the cargo tanks, and then it's important to check together all the ballast tanks, any void spaces, to confirm that there are no cargo liquids in void spaces or ballast tanks. Q And who actually does the soundings of the cargo tanks and the ballast tanks during the joint survey? A Typically now -- years ago it used to be the cargo inspector, but with modern instruments, they usually use a ship's electronic tape and thermo probe. On this occasion, they used the ship's instrument. It was agreed that it was accurate, and as I recall, one of the ship's crew used the instrument, and everybody wrote down the readings together. Q Okay. Now, when Mr. Castillo was on the vessel on the 27th, and he performed -- completed his report, did he actually do soundings of all of the various tanks? A On the 27th? Q On the 27th. A Yes. Q Okay. A He was requested to check all the ballast tanks as well. Q So his report reflects what his readings were on the 27th? A Yes, except he apparently didn't record all the ballast tanks, although he did -- he told me he had checked them. Q Okay. Now, during the joint inspection, was any record kept of the joint inspection? A On the 29th? Q Yes. A Yes. Q And I'm going to show you P-424. MR. BERGERE: Can we have that document? (Pause.) BY MR. BERGERE: Q Can you tell me what this document is? A It's the BSI inspector vessel ullage report. Q So this is the BSI report, BSI was Citgo's public gauger that was on the vessel to observe the ullage readings, and the ballast tank readings, on the vessel on that occasion? A Yes. Q



And are the recordings that were reflected there, are they consistent with Caleb Brett's -- what Caleb Brett reported on that occasion? A Yes, I've checked that. Q Okay. And what's the condition that BSI is reporting for the ballast tanks? Can you point that out? A Yes, the ballast tanks are recorded as empty -- Q Well, I see -- A -- which is -- Q -- okay, go ahead. A -- which is an abbreviation for the word empty, "EMPTY." It's used very commonly.")

<sup>146</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 145:24-146:18 ("Q Okay. If any significant ballast had inadvertently been taken on by the ship as it came up the river, what would, in your opinion, have happened? A As the vessel came up the river -- well, it would depend on the quantity and where and how it was taken on board. Q If it was inadvertently taken though, inadvertently taken, let's say it went into the forward ballast tank and a couple of the starboard ballast tanks? A Well, of course the trim or heel of the vessel would change and you would notice a difference in the attitude both, as I said, in the trim and the heel of the vessel. Q Is it possible to take ballast on inadvertently and not affect the ship's trim or heel? A Well, it depends on the quantity, but certainly any significant quantity you would notice it, you would get a list or a change in trim. Q Why is that? THE COURT: It's heavy. THE WITNESS: Well, simply because of its effect on the ship.")

<sup>147</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 195:16-196:1 ("Q Now, would you agree with me that if the vessel was leaking water into ballast tanks, in whatever amount, in order for the ship to remain upright, without any list, she would have to leak the same amount of water into tanks on the port side, as tanks on the starboard side? A I believe, if I understand your question, that would be true. But I'm not sure I understand the question. Q No, that is the question. A Well, sorry -- THE COURT: He's agreeing with you, go on to something else.")

<sup>148</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 110:8-111:15 ("Q Why would you expect the ship to list if it was leaking water into a ballast tank? A Well, I'm pretty familiar with tankers, because I worked as a Chief Mate on a tanker for almost ten years, and the way ballast tanks are arranged, they're typically port and starboard, each one is controlled by a valve, independent valve, and if you have a leak it's almost impossible to expect that it's going to be a leakage evenly on both sides of the vessel. If there's any difference in the leakage rate, which would almost be a certainty, the ship would start to develop a leak -- or, excuse me, a list. Q As a Master or a Pilot of a ship, how much of a list does a ship have to develop before you're able to notice it, let's say if you're on the bridge? A If you're on the bridge piloting a ship, you're watching it fairly closely and fairly constantly; it wouldn't take much, probably half a degree. Q Have you seen the security video of the ATHOS as it initially arrived in Mantua Creek off CITGO? A Yes. Q Did the vessel appear upright to you? A It did. Q That means no list? A That's correct. Q And how did you determine that? A Well, you could tell just looking at the aspect of the -- THE COURT: By looking at it. BY MR. O'CONNOR: Q Well, what did you see on the ship that enabled you to determine that it wasn't listing? A Well, you could see looking at the deck floodlights that are facing forward, you could see that they were relatively or almost exactly horizontal.")

<sup>149</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 34:4-36:1 ("Q Well, forget about this. From your memory standing there on the starboard bridge wing, was the ship listing at this point in time? A No, no, it's very easy to see the listing. There is no list during that time. It's very easy to see from bridge if you have even a small -- a small list of half degree. It's very, very easy to see, because you can see the lights -- THE COURT: No, but the question is: You were standing on the bridge, you can experience whether there was list or not quite easily; is that right? THE WITNESS: There was -- yes, I can see easily. THE COURT: Okay. Well, just listen to the question. THE WITNESS: I can see easily. BY MR. LEVY: Q Okay. A There is no list at that time, of course. Q Okay. And is there another tugboat alongside that we can't see in this video? A Yes, it's on the port side -- Q Forward. A -- forward, bow. Q On the bow. A And I don't -- I don't hear forward. We can see at this moment. Q Okay. MR. LEVY: Proceed. (The tape was played at this time.) THE WITNESS: Now, we start turning. (Pause.) From here, from the lights, we can see that there is not any list. As I can see from this video, the ship is even keel, and here show a few -- few seconds here's the tugboat. BY MR. LEVY: Q The tugboat is going around? A Yes, it's leaving the starboard side, which is going to touch at the berth and going to the port side. Q Actually, the first one was not the tugboat. A It's not the -- Q It's the second one. A The second one, that's correct. Here is Citgo's berth. (Pause.) Q Those are airplanes coming in? A This is the berth. We are going to berth here. THE COURT: Do you detect a list there? THE WITNESS: Not yet. The list is not -- it's going to show that it's close.")

<sup>150</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-17:16 (" BY MR. O'CONNOR: Q Can you describe, Captain Bethel, what's going on here? A Yes. We're proceeding into the anchorage with a tugboat on each bow. We're turning the vessel to starboard, flood current setting us up river. I'm working the vessel ahead, I'm backing the tugs on the starboard bow and coming out on the port bow. We're starting to proceed towards the dock now,

we're in the anchorage, still turning to starboard. Q Now, up to this point would you consider the maneuver that you were conducting to be routine? A Yes. Q Up to this point do you believe that the vessel had touched bottom or scraped bottom? A No. Q Okay. Are you able to offer an opinion as to the vessel's trim at a keel at this point? A Yes, she looks fine. She looks even keeled, she doesn't look like she's listing at her side to either side. Q What do you base that on? A The bridge deck lights. Q What about them leads you to think that the ship's on even keel? THE COURT: They seem fairly level. THE WITNESS: Horizontal, yes. BY MR. O'CONNOR: Q Okay. Let's continue, please. A Okay. I am still bursting over towards the dock, I'm releasing the tugboat on the port bow to come and put a line up on the starboard quarter, still turning to starboard. I want to get the vessel horizontal with the dock before I can breast it towards the dock because after you leave the anchors there's shoals above the dock and below. So you want to get the vessel's manifold lined up with the chick stands which are right here and you want to breast the ship straight in. Q That's so you avoid the shoals to the north and south of the dock? A Yes. And now we're starting to fall aft getting the ship in line but now the ship is starting to list. I'm easing the tugs off. Q And again your opinion that the ship is starting to list is based on you're pointing to the -- A The deck lights.")

<sup>151</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7 ("Q And did you also take a look at the Citgo security video from the night of the accident -- and we will graciously not play it again -- and what did that security video show you? A All I could deduce from it was just before the accident, I believe it was about five minutes before 9:00 o'clock, the vessel was pretty much aimed onto the camera, and so you could see that the vessel did not at that point have a list.")

<sup>152</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 105:16-106:1 ("Q So, for that theory to work, then the ballast would have to enter through the various valves to come on to the ship and then have been unintentionally or intentionally placed in tanks evenly, so that the ship didn't list? A Whether it was un-intentional or intentional, it would have had to have been placed more or less evenly side to side. Q Now, do you agree with me that that's highly unlikely, if it was done un-intentionally? A I'm not -- I don't have an opinion as to the likelihood of it.")

<sup>153</sup> Trial Tr. Day 11, October 7, 2010, Hall, at 15:21-17:5 ("Q Would the thanks -- there had been any effort to de-ballast the tanks, would you have been able to tell? A Yes, I would have been able to tell from the inspection that was done on the 29th. Q How was that? A Well, the ship was trimmed one meter by the head. The tank suction for the ballast tanks are at the aft or end. So, if there had been water in the ballast tanks that we didn't know about, hadn't been deducted, when the ship came to even-keel the water would have come under the sounding points that were monitored on the 29th. And even if crew had tried to discharge ballast when the ship was by the head before they trimmed it to even keel with cargo, then there would have been some water remaining, because you cannot strip or empty ballast tank when the ship is even-keel, it has to be trimmed a meter to two meters by the stern to remove all the water. Q So, after the incident, once the vessel had taken a list, you're saying that the crew could not have de-ballasted it? A Due to the list on one side, the list may have helped de-ballasting on one side, but the forward -- the downward-ahead trim would have prevented -- certainly prevented draining the tanks on the other side. Q And you were actually in the 6 P Tank and didn't observe water in that tank? A Correct. MR. BERGERE: No further questions, your Honor. RECROSS-EXAMINATION BY MR. WHELAN: Q So, you would agree that the trim on the one side would have allowed de-ballasting, correct? A It would have assisted some de-ballasting, but it wouldn't have -- the tanks, it's unlikely they would have been able to drain completely. Q Thank you.")

<sup>154</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 142:18-144:20 ("MR. LEVY: Could we put that up on the screen, please? P-481 at Athos-011073. THE WITNESS: Yes, I did look at this. BY MR. LEVY: Q Okay. Now, this is a document we have shown several times already, so we're not going to go into the detail of this. I'm just asking you, what about this document led you to conclude there was no ballast on board, other than what was reported in the 7 Wing tanks? A It recorded that the ballast tanks were empty. Q Okay. MR. LEVY: Now, can we also look at the BSI ullage report for November 29th at P-424, please? And it's BSI-0184. BY MR. LEVY: Q Did you also take into consideration this BSI ullage report from November 29th? A Yes, I did. Q And using your pointer, can you point to -- on this ullage report what it shows with respect to the ballast tanks? (Pause.) A Nothing recorded here for the ballast tanks, they're empty. MR. LEVY: Could you highlight the ballast tanks for us, please? Okay. THE WITNESS: On the left-hand side, where I have the pointer -- MR. LEVY: You have to point at this screen. THE WITNESS: Sorry. Here, the ballast tanks are shown, Number 1 Port and Starboard all the way down to 7 Port and Starboard. BY MR. LEVY: Q Now, this is showing some ballast in the 4 Starboard tank, is it not? A Yes. Q And this is on November 29th, 2004, correct? A That's correct. Q So, was this part of the ballast that was taken to trim the vessel that was taken on November 28th, I think it was? A Yes. They did some adjustments and that was the ballast taken on board to bring the vessel on an even keel. Q And of course the 7 Port tank shows a significant amount of ballast

in there; that's the tank that was flooded? A That was the tank that was flooded and it was open to the sea -- or the river. Q And the 7 Starboard Ballast tank, was that also used to trim the vessel? A Yes, that was also used to bring her up onto an even keel. Q Okay. But all the other ballast tanks showed it as being empty? A Yes, correct.")

<sup>155</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 11:7-19 ("Q All right. Now, which of these drafts did you not take into consideration, or feel you could rely upon, in forming your opinion as to what the arrival draft was? And these drafts, let's assume they're taken on the 27th, the day after the incident? A Yes, I did not take into account the port and midship draft. Q Can you just point to it with the -- yes. A There. It's too vague and it's understandably so because at that time the highest draft mark on the ship -- the midships is at 13 meters, and with a list of approximately 7 degrees, that draft mark would have been submerged, and I believe that's why he was not able to record a reading.")

<sup>156</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 153:17-154:4 ("Q Okay. You have a line going between these two, you're going to have to explain what that means. A Yes, that line is connecting the two draft marks of Mr. Castillo -- that Mr. Castillo recorded and that creates an angle with the horizontal of 6.9 degrees. Q Is that the ship's list? A Correct. Q And is that a port list? A That's a port list, you can see that the line is -- that line connecting them is in effect the water line, the inclined water line of the hull, the still water line. So, it's greater on the port side and it's consistent with what was being recorded for the vessel's list.")

<sup>157</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 75:4-76:3 ("A And all I am doing here is to damage No. 7 port and No. 7 center. That is indicated right down here. Those two tanks are indicated as being flooded, okay? Flooding those tanks, in terms of the calculation, simply means we remove those tanks from the hull, leave everything the same, and see where the ship would have floated, and this calculation shows that the ship would have floated at a mean draft of 11.399, and a heel angle of 5.88 degrees. Now, when I looked at Mr. Castillo's ullage report, he indicates the mean draft to be 11.5, not 11.4, or 11.399, and he indicates a heel angle of 7 degrees, and the 7 degree heel is borne out by other independent observations. So the page that we were looking at just a moment ago, the next page in the report, says, Okay, this calculation, just damaging those two tanks, taking where we were in agreement with Mr. Bowman, and damaging those two tanks, does not get us to where Oscar Castillo observed the ship to be on November 27th. In order to produce a draft of 11.5, in agreement with Mr. Castillo, I did the calculation on the following page that we just looked at, and obtained a calculated draft of 11.502, which I deemed to be in very close agreement with the 11.5 that Mr. Castillo had, and the heel angle of 7 degrees -- ")

<sup>158</sup> Trial Tr. Day 9, October 5, 2010, Umbdenstock, at 23:21-24:3 ("Q Is that a -- the photo that appears on the screen, is that a photo that you took? A Yes, it is. Q Does that depict the stern of the Athos? A It does. Q Okay. Were you able to tell anything about that ship regarding whether or not it had a list? A Well, it was obvious that it had a port list, yes.")

<sup>159</sup> Trial Tr. Day 9, October 5, 2010, Umbdenstock, at 35:23-36:3 ("Q Once the ship was -- once the list was taken off the ship, what was the next step in the operation -- or, I'm sorry, first can you tell us, when was the list taken off the ship? A The list was taken off on the -- later that day on the 27th -- or the 28th, I guess, the next day.")

<sup>160</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 95:2-7 ("Q Okay. And that bunker consumption could be used to run the turbines to create steam to heat the cargo, couldn't it? A Of course. Q And there was a requirement that the cargo be kept heated to 135 degrees, wasn't there? A Yes. No -- ")

<sup>161</sup> Trial Tr. Day 26, November 15, 2010, Petrie, at 95:23-96:10 ("A Now, we are presumably still heating cargo and we're still doing whatever else the ship normally does. Now, if we were to look back in history, we would see that the 17 tons or so is kind of a normal level for whatever the ship does day to day, but that the 22.3, there appears to be no explanation offered in the engine log. So, the question is, what was that extra fuel being consumed for and the supposition is that perhaps it was being used to discharge ballast, using the steam-driven ballast pumps. Q Okay, that's put speculation on your part, isn't it, Professor? THE COURT: Impure, impure speculation. Q Impure speculation, too.")

<sup>162</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 15:25-18:12 ("BY MR. O'CONNOR: Q Can you describe, Captain Bethel, what's going on here? A Yes. We're proceeding into the anchorage with a tugboat on each bow. We're turning the vessel to starboard, flood current setting us up river. I'm working the vessel ahead, I'm backing the tugs on the starboard bow and coming out on the port bow. We're starting to proceed towards the dock now, we're in the anchorage, still turning to starboard. Q Now, up to this point would you consider the maneuver that you

were conducting to be routine? A Yes. Q Up to this point do you believe that the vessel had touched bottom or scraped bottom? A No. Q Okay. Are you able to offer an opinion as to the vessel's trim at a keel at this point? A Yes, she looks fine. She looks even keeled, she doesn't look like she's listing at her side to either side. Q What do you base that on? A The bridge deck lights. Q What about them leads you to think that the ship's on even keel? THE COURT: They seem fairly level. THE WITNESS: Horizontal, yes. BY MR. O'CONNOR: Q Okay. Let's continue, please. A Okay. I am still bursting over towards the dock, I'm releasing the tugboat on the port bow to come and put a line up on the starboard quarter, still turning to starboard. I want to get the vessel horizontal with the dock before I can breast it towards the dock because after you leave the anchors there's shoals above the dock and below. So you want to get the vessel's manifold lined up with the chick stands which are right here and you want to breast the ship straight in. Q That's so you avoid the shoals to the north and south of the dock? A Yes. And now we're starting to fall aft getting the ship in line but now the ship is starting to list. I'm easing the tugs off. Q And again your opinion that the ship is starting to list is based on you're pointing to the -- A The deck lights.")

<sup>163</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 18:7-12 ("Q We saw it on the video but can you just tell us when in the course of the maneuver did the ship take the list to port, was it when you start, the tug starting breasting her in? A It was after we got turned around, our bow was down river and we were midway or more so through the anchorage.")

<sup>164</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 19:20-23 ("Q All right, so did the list increase over time? A Yes, it did. Q What was the ultimate list? A About seven degrees.")

<sup>165</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, 34:2-35:11 ("Q Was the ship listing at all at this point? A As we can see, no. It's -- it's -- Q Well, forget about this. From your memory standing there on the starboard bridge wing, was the ship listing at this point in time? A No, no, it's very easy to see the listing. There is no list during that time. It's very easy to see from bridge if you have even a small -- a small list of half degree. It's very, very easy to see, because you can see the lights -- THE COURT: No, but the question is: You were standing on the bridge, you can experience whether there was list or not quite easily; is that right? THE WITNESS: There was -- yes, I can see easily. THE COURT: Okay. Well, just listen to the question. THE WITNESS: I can see easily. BY MR. LEVY: Q Okay. A There is no list at that time, of course. Q Okay. And is there another tugboat alongside that we can't see in this video? A Yes, it's on the port side -- Q Forward. A -- forward, bow. Q On the bow. A And I don't -- I don't hear forward. We can see at this moment. Q Okay. MR. LEVY: Proceed. (The tape was played at this time.) THE WITNESS: Now, we start turning. (Pause.) From here, from the lights, we can see that there is not any list. As I can see from this video, the ship is even keel, and here show a few -- few seconds here's the tugboat.")

<sup>166</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 145:1-7 ("Q And did you also take a look at the Citgo security video from the night of the accident -- and we will graciously not play it again -- and what did that security video show you? A All I could deduce from it was just before the accident, I believe it was about five minutes before 9:00 o'clock, the vessel was pretty much aimed onto the camera, and so you could see that the vessel did not at that point have a list.")

<sup>167</sup> Trial Tr. Day 12, October 12, 2010, Bowman, Day 12, at 79:12-80:18 ("MR. DeGIULIO: Could see ATHOS068450. BY MR. DeGIULIO: Q Do you recognize this as an internal memo that was prepared in connection with your work in this case? A I believe so. MR. DeGIULIO: Okay. Can we highlight the section at the bottom, please? THE COURT: I'm sorry. But saying "internal memo," doesn't tell me anything. Whose document is this? Where was it prepared? BY MR. DeGIULIO: Q Did you prepare this particular document or somebody else in your company? Do you remember? MR. DeGIULIO: Could we blow the whole thing up, so he can read it. Thank you.

THE WITNESS: I believe I asked Alan Stewart, one of my colleagues to look at this, and so he would have prepared this. BY MR. DeGIULIO: Q Okay. And you know that this came from your files, you saw it in your deposition? A Yes. Q Now, this document out of your file shows that the ship's calculated pre-incident draft would be 37 feet if a relatively minor amount of additional ballast water was, in fact, aboard the vessel, as compared to the amount reported by the crew; isn't that true? A What quantity of ballast are you talking? What, 390 tons? Q 349.8 tons of ballast. A I don't believe that's a minor quantity in terms of what you would know was on board your ship or not.")

<sup>168</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 140:17-141:3 ("THE COURT: In your opinion, how much difference in weight would it take to increase the ship's draft by one inch? THE WITNESS: Approximate -- well, one centimeter is about 64 -- BY MR. LEVY: Q 64 what? A Tons, and so it's two and a half times that for one



inch. So, about 150 tons, I believe, yes. Q So, you have to add 150 tons to the ship to increase the ship's mean draft by one inch? A Correct.")

<sup>169</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 59:21-60:9 ("Q What do seaman do on the ATHOS 1 -- what did they do on the ATHOS 1 when they had closed manual valves to confirm or to show themselves that later, if they looked at it, they knew it was closed? A It's -- it's common practice for all seaman, the valves that are closed to be tied with a rope, so that anybody who can see a valve does not have -- is not tied to understand that the valve is open. Otherwise -- otherwise, when he sees the valve is tied with a rope, he understands that the valve is closed. Q When you ordered the pumpman to close the valves, did he report back to you at any time that he had done that? A Yes, of course. He called me on the radio and he reported to me that the valves were closed.").

<sup>170</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 74:4-13 ("MR. LEVY: Now did you get a report from the pumpman who you had sent to check the pump room? THE WITNESS: Yes, at that time, when I'm going back to cargo control room, the pumpman call me on the radio and saying that everything is okay down in pump room. The (indiscernible) of pump room was clear and dry and all the valves was lessened. MR. LEVY: Were latched? THE WITNESS: Yes, all the valves were closed and lessened. Same word to me.")

<sup>171</sup> Figueros Dep. Vol. 2, August 2, 2007, at 160:3-11, 15 ("Q. Did anybody give you any orders after that moment in time? A. When it was listed, all of us, we were thinking what was happening, because we really didn't know what the reason why it had listed. And then the order from the chief mate was, at that time, to go down to the pumproom and check the valves. That was it and I reported back to him. I reported back to him that all the valves were closed. Everything was closed. All of it. And it was lashing.") ("A It was tied -- lashing.")

<sup>172</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 62:16-63:16 ("MR. LEVY: So in order to operate these valves, you have to turn on the hydraulic pump first? THE WITNESS: Yes, of course. MR. LEVY: And if you turn off the hydraulic pump, can these valves open or close? THE WITNESS: Yes, it must be open, the hydraulic pump, in order to open these two valves, to open or close these valves. MR. LEVY: Okay. My question was not clear. When the hydraulic pump is in operation, you can control these valves from the cargo control room; is that correct? THE WITNESS: Yes, of course. MR. LEVY: Okay. And once you've closed the valves, and turned off the hydraulic pump, can these valves open? THE WITNESS: No, no to open. You need pressure, hydraulic pressure to open again these valves. MR. LEVY: Okay. Now, these three valves that are manually operated here from the pump room, Valves 1, 2, and 3, do these valves need to be opened in order to take ballast into the ballast tanks? THE WITNESS: Yes, of course. MR. LEVY: If any one of those valves is closed, will you be able to get ballast into the ballast tanks? THE WITNESS: Not possible. If any one of this three valves is closed, not possible.").

<sup>173</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 73:6-10 ("MR. LEVY: So in order to operate any valves, either ballast valves or cargo valves in the tanks, you needed to have the hydraulic pump running? THE WITNESS: Yes, of course, must have pressure on the valves from hydraulic pump.")

<sup>174</sup> Trial Tr. Day 17, October 20, 2010, Raggousis, at 56:11-21 ("Q. The ballast system on the Athos was equipped with remotely controlled hydraulic valves to direct ballast water into and out of specific tanks, right? A. The valves of the ballast tanks, which are located inside the ballast tanks, are opened and closed from the ballast cargo control room. Q. And those are hydraulic valves, right? A. Yes. Q. And to operate those hydraulic valves, it was necessary to use the hydraulic pump? A. Yes.").

<sup>175</sup> Trial Tr. Day 5, September 28, 2010, Zotos, at 11:6-12 ("Q And he also told you the ballast valve position indicators in the cargo control room were not working properly, correct? A He told me that the indicating lamps sometimes did not operate properly. Not that the valves themselves did not work, only the indicating, the indicating lamps which were located in the console in the cargo control room.")

<sup>176</sup> Trial Tr. Day 5, September 28, 2010, Zotos, at 68:16-69:18 ("Q There was a problem with the hydraulic valves in the ballast system, wasn't there, on the ship? A The gauges of these valves, indicators, the indicators of these valves had a problem. Later on after the inspection of the chief engineer of the port engineer we discovered it was not a major problem, there was a problem with a solenoid and the valves were operating properly, they were opening and closing properly. We, however, for safety reasons during closing we allowed a few seconds more for the switch of the valve in the closed position and at the same time we checked, we found the console the mechanism and we observed if indeed the valve was open or not. MR. DeGIULIO: Close this highlight and highlight Paragraph 5 of this e-mail. BY MR. DeGIULIO: Q In the e-mail dated November 13th, 13 days before the incident, the captain

says "ballast and cargo valves open and close on their own." Do you recall that problem happening on the ATHOS in November 2004? A I have to repeat that in all actuality the valves did not open and close, only the indicator lamps remained leak with the indication green when we turned the switch in an up position. And as I already explained, we kept the switch for a while longer in the closed position until we saw the green light to be extinguished altogether. And at the same time we checked the actuators which were located behind the console in the control room. And we saw, we observed that the valve was in the closed position.")

<sup>177</sup> Trial Tr. Day 5, September 28, 2010, Zotos, at 71:22-72:7 ("Q Now hydraulic valves in the ballast system which control the individual ballast tanks opened and closed on their own it would be possible, would it not, that ballast would be inadvertently directed into a tank that you did not intend during a ballasting operation? A Yes, it is. But as I testified earlier there was no realistic problem with the valves of the ballast. I remember the port engineer, Mr. Livanos, who came on board the ship after the incident. He checked the valves and the switches and he realized, ascertained that there was no real problem in the opening and closing of these valves on their own.")

<sup>178</sup> Trial Tr. Day 17, October 20, 2010, Raggousis, at 77:19-78:6 ("A Could you highlight paragraph five, right above this, please. In the same e-mail, the captain tells -- the captain of the ship tells Captain Iliopoulos that ballast and cargo valves open and close on their own. What action did you take when you learned, on or after November 13, 2004, that ballast valves aboard the vessel were opening and closing on their own? A This was never reported officially and it's not accurate that the valves were opening and closing on their own. It was a matter for the indicator lights. There was a way to check the cargo control in the console. When they opened, the gate or the gauge to see exactly the position of the valves inside -- within the hydraulic system.").

<sup>179</sup> Trial Tr. Day 17, October 20, 2004, Raggousis, at 93:21-94:17 ("Q Can we back up, please. The gauges, the lights that would come on and off, did that suggest to someone standing in front of the panel, did that suggest that the valves, themselves, might be opening and closing, without an instruction to do so? A Yes, of course, it can. Q Okay and was that problem investigated by you or someone on your staff? A Yes, we investigated. Q And did you find that the problem was with the valves, themselves or was with the indicator lights? A It was with the indicator lights. Q I want to make sure we're perfectly clear here. On Athos I, on the date of the accident or prior to the date of the accident, the weeks before that, was there any problem with ballast valves or cargo valves opening and closing on their own? A No, the valves were not opening and closing on their own. It was only a matter of the indicator lights. And in case one of the lights, changed color, it was easy to open the inspection door and look inside the correct position of the valves." )

<sup>180</sup> Trial Tr. Day 17, October 20, 2010, Raggousis, at 43:11-18 ("A The ballast line, except for a visual inspection, it is not easy to see the condition of the piping internally, due to the fact that it is working continuously. Some minor holes occur from external corrosion -- internal corrosion. For this reason, we did pressure testing of all the lines, ballast lines, three bars, about 45 PSI, to be sure that the lines do not have any leakages and that they are in good condition." )

<sup>181</sup> Trial Tr. Day 4, September 27, 2010, Zotos, at 38:25-40:10 ("Q What was causing the problem with stripping the ballast tanks? A There were two -- there were two holes in the ballast line, No. 1 port side ballast tank and forward ballast tank, and when they were at a level that was seated below the holes, the ballast tanks did not have suction -- the ballast -- the ballast pump did not -- did not have enough suction. Q Where was the ship when you noticed this problem? A From the very first moment I boarded the ship at City de Grande in Panama. Q Approximately how many cubic meters of ballast did you have trouble stripping from the ballast tanks? A If I remember well, about 200 cubic meters. Q Were you able to remove that ballast using the eductor? A Yes, of course. Q And were you able to fix that problem before you arrived at Portal Miranda? A Yes, of course. We -- we repaired -- we repaired this problem with the lines, one (indiscernible) before we arrived at Portal Miranda. If I remember well, on November 4th, after we departed -- after we departed Amway Bay (ph) in Venezuela. Q How did you fix the problem? A Me and the pump man together, we went -- we went inside one port ballast tank, and into the forward ballast tank, and we put -- we attached clamps where the holes were. Q Did you have a problem stripping the tanks after you fitted the clamps? A No, after that the ballasting was done properly. Q Using clamps to repair holes in ballast lines, is that a common method of a temporary repair? A Yes, of course. We had to put on shape -- we had to put on shape clamps of different sizes, which we had them as -- which we had them on board as spares in case of leakages. Q Were they part of the spare parts inventory? A Yes. ")

<sup>182</sup> Trial Tr. Day 5, September 28, 2004, Zotos at 58:2-19 ("Q On September 23rd Captain Ladanicolos was reporting the ballast line was in moderate condition with clamps in No. 1 port, 2 port and 5 starboard ballast tanks.

You saw this report when you reviewed it with the former chief mate, right? A Yes. Q Yesterday -- strike that. The clamps that were on the ballast line you understood that they were there to cover holes in the ballast line caused by corrosion, right? A Yes. Q Yesterday you testified in response to Mr. Levy's question that you and the pump man, Figueros, entered the vessel's forward ballast tank and the No. 1 port wing ballast tank on November 4, 2010, is that right? A Yes. Q And the purpose, according to your testimony, was to put clamps on holes in the ballast lines in those tanks, right? A Yes.")

<sup>183</sup> Chasan Dep., Vol. II, Spetember 27, 2007, at 99:22-100:1 ("Q. Were portions of the ballast lines in the ballast tanks replaced during the shipyard period in Alabama? A. Yes, I think in Alabama, they replaced some.")

<sup>184</sup> Trial Tr. Day 5, September 28, 2010, Zotos, at 10:9-24 ("Q When you joined the ATHOS in October 2004 and spoke to the former chief officer, Mr. Katsobrias, he told you -- A Yes, yes. Q And when you spoke to him he told you that the ballast tank gauges in the cargo control room were not working properly, correct? A He told me not that they were not working properly, simply he told me that the readings were not accurate. Q Well, if the readings weren't accurate then the gauges weren't working properly, right? A No, in my opinion the diff-- there was no great difference in the readings. If we're talking about certain, several centimeters, a difference between reality, the truth. From my experience we never observed, we never noticed the readings from these gauges but we took -- we took manual readings from the deck using -- using a floater tape.")

<sup>185</sup> Trial Tr. Day 5, September 28, 2004, Zotos, at 81:13-82:1 ("Q Item 14 from this report from September 23rd "Ballast mercury sounding system in CCR out of order." So we saw it in May, we see it in September. Captain Lananicolas is using the words "out of order." Does that mean to you that this system was not working at all at that time? A No, that's not what it means because this record as well as the previous one was done by the company port captains that were using the term "out of order" to push the port engineers of the company to assist the ship in order for certain works to be effectuated. The ballast mercury sounding system of the ATHOS I during the time I served on board the ship and prior to the incident was working properly if simply the readings were not accurate, they had some differences, variances in centimeters.")

<sup>186</sup> Trial Tr. Day 17, October 20, 2010, Raggousis, at 51:8-16 ("Q The specification for repair of the ballast gauges required you to arrange for a service engineer, from the manufacturer, to come to the shipyard to repair the gauges, didn't it? A When we cannot repair something ourselves, with the means available on board the ship or without -- then perhaps we have to invite others to assist and do the repairs. This system was surveyed and it was repaired from Mr. Pat Seraikis in the course of the repairs in China.")

<sup>187</sup> Trial Tr. Day 17, October 20, 2010, Raggousis, at 52:21-53:11 ("Q And after -- and on May 5, 2004, after the shipyard repairs were all done, Captain Bartsis reported those gauges were out of order, right? A When? When? THE COURT: He wants to you to tell him when. THE INTERPRETER: He wants to know the date, what date? Q On May 5, 2004. A When the ship is in drydock, with the ballast tanks empty, the only thing we do is to zero adjust. The following adjustments -- the subsequent, the subsequent adjustments have to be performed when the ship -- when the tanks contain a ballast. We have to measure with the units tapes how -- what is the quantity inside the tank and then to adjust the gauges. And there was no other way that we could do any additional adjustments.")

<sup>188</sup> Trial Tr. Day 17, October 20, 2010, Raggoisus, at 90:6-91:23 ("Q Now, sometimes, we refer to them as the mercury ballast gauges and sometimes we refer to them as the pneumatic ballast gauges. Why do we call them the mercury ballast gauges? A This system works by air and the air returns into the system and depending on -- it triggers, it triggers a system of the mercury. Q Okay, let me lead you a little bit. These gauges that we see here, are they normally filled with mercury? A Yes, they are filled with mercury. Q Okay, and this system of gauges is connected to air lines, is that correct? A With air, with air lines. Q And the air lines go all the way to all of the ballast tanks, is that correct? A The air line, for each tank, is separate, goes into the ullage (ph) pipe and depending on the level of the liquid inside the tank, it returns and it pushes up or down the level of the mercury. Q Okay. And am I correct in saying that one of the problems on the Athos I, regarding these gauges, was that they didn't give accurate readings of how much ballast was in the ballast tanks? MR. DeGIULIO: Objection, leading, your Honor. THE WITNESS: They did not give accurate measurements of the quantity of liquid inside the tank. BY MR. LEVY: Q Now, did the crew on the Athos I, rely upon these ballast gauges to determine how much ballast was in any ballast tank? A No. MR. DeGIULIO: There's no foundation of personal knowledge of this witness. THE COURT: Objection overruled. For heaven's sake, don't quibble. BY MR. LEVY: Q Mr. Raggousis, on any ship in the Tsakos managed fleet, where they had pneumatic ballast gauges, do any of the crew rely upon the gauges exclusively to determine



how much ballast is in a ballast tank? A No. All the measurements, the correct measurements, were taken manually with portable outage tapes. Q With sounding tapes? A Sounding tapes, correct.””)

<sup>189</sup> Trial Tr. Day 14, October 14, 2004. Markoutsis, at 55:9-57:6 (“Q Now, was there a problem with the mercury ballast gauges when you joined the ship? A Yes, they were out of order. Q And do you need these gauges to determine the levels in the ballast tanks accurately? A No, no, only for reference. We use -- even today in the shipping business, we use these indicators for reference only. Even in the modern ships, we use -- Q In the modern ships? A -- in the modern ships, we use electronic tapes to measure the cargo in the tanks and flooding tapes in order to measure the ballast inside the ballast tanks. Q Did you do anything about this problem with the mercury ballast gauges? A Yes, we try many times to fix this problem and I request assistance from the office -- Q Who did you request -- A -- regarding this matter. Q Who did you request assistance from? A From the technical -- from Mr. Mikal Ragousis. Q Ragousis? A Ragousis, R-a-g-o-u-s-i-s. Q And did you do any of the work that Mr. Ragousis recommended? A Yes. He told us to clean the air filters for these indicators and he also advised me where is the -- where these filters were located. Q And did that work fix the problem? A Yes. At first, as I said, we have the (indiscernible) line, but -- Q Okay, you have to speak a little more slowly. First what? A First we have indication, we have -- Q The ballast gauges gave you some indication? A Yes, we have an indication, which was totally wrong. So, I contact again, with him again, and I ask him what we have to do. I explain him the problem and he tell us that we have to -- there were some nozzles of each ballast tank. So, we have to open also these nozzles and check them and clean them. This was his advice. Q And did that fix the problem? A Yes. But, as I say before, the indicators was not accurate. Q So, they would go up and down, but -- what do you mean, they were not accurate? A I mean -- I mean they are moving, but if we have three meters of water in the ballast tank it shows 280, 290; it was not accurate.”)

<sup>190</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 147:13-19 (“Q And what's the importance of calculating anticipated minimum under-keel clearance for the transit of a single hull tanker? A Well, the anticipated under-keel clearance is the safety margin provided to the ship, in order to account for any deficiencies in charting or charting surveys, take into account any unknown obstructions or shoal areas.”)

<sup>191</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 170:22-171: 9 (“Q Now, do you have opinion, Captain Haley, as to the purpose of calculating anticipated under-keel clearance, as required by 33 CFR 157.455-B for the transit of a single-hull tanker? A Well, sure, the purpose is to provide an adequate safety margin to account for unknowns, to account for the fact that surveys are not perfect. That there are unknown, uncharted objects in shoal areas that are reported all the time. And so, then we've come up with under-keel clearance to provide a safety margin for such things. And particularly, in the case of a single-hull tanker, where the risk of oil spills even greater with only a single plate of steel between crude oil and the sea.”)

<sup>192</sup> Trial Tr. Day 29, November 18, 2010, Anderson, at 78:17-23 (“Q And how does safety margin and this risk management apply to a vessel like the ATHOS I? A The safety margin within the context of this particular incident is the under keel clearance to make sure that there is always going to be a minimum amount of additional water under the keel to pass over all the (inaudible) ...depths that you're going to go through.”)

<sup>193</sup> Trial Tr. Day 29, November 18, 2010, Anderson, at 118:13-18 (“Q And that type of hazard or risk, what is the barrier, in your opinion, within a Safety Management System that is used to deal with the risk of unknown, uncharted obstructions within navigable waters? A That is the creation of the safety barrier, which is the under-keel clearance.”)

<sup>194</sup> Trial Tr. Day 29, November 18, 2010, Anderson, at 119:15-120:5 (“Q So, a prudent passage planner should plan for a sufficient amount of under-keel clearance that takes into account normal uncharted, unpredictable objects, correct? A Yes, I couldn't disagree with that, yes. Q And that amount of under-keel clearance is generally recognized in the industry to be a certain either percentage of the ship's under-keel clearance or stated in terms of an exact number, such as the number of feet -- THE COURT: I think you meant of the ship's draft, did you not? MR. LEVY: Excuse me? THE COURT: Percentage of the ship's draft. You said -- MR. LEVY: Yes, a percentage of the ship's draft. I apologize, your Honor. THE WITNESS: That is correct, yes.”)

<sup>195</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 87:22-88:6 (“Q Okay. You mentioned "squat." What is vessel squat and how does it relate to the calculation of anticipated under keel clearance? A Well, squat is a reduction in draft of a vessel, or, if you would, the sinkage of the vessel. It's generally most pronounced in restricted channel. The biggest factor is the speed, but dimensions of the vessel also are a factor. Q You said in

your answer it was a reduction of draft. Did you mean actually an increase of draft? A I'm sorry. It is an increase in draft.")

<sup>196</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 89:17-21 ("Q Is that because the mariner, in your opinion, must consider the known risk of uncharted objects and hazards to navigation when determining the safe under keel clearance for his or her vessel? A Yes.")

<sup>197</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis at 59: 5-15 ("Q Finally, Captain, in planning this voyage, do you think you should have anticipated that there would be an obstruction, such as the anchor that we see here in the large photographs, in the approach to Citgo's berth, do you think you should have anticipated that and planned for that? A You cannot do this for unknown objects, when -- I mean, when I prepare my process plan, I have to use anything I have in my hands. This anchor was not -- we don't have it on the chart, we don't have any information about this danger, this anchor. So, how to plan it, how to plan this -- how to avoid it is -- if I don't know what it is and --")

<sup>198</sup> Trial Tr. Day 8, October 4, 2010, Bethel at 26:10-27:2 ("Q Okay. Now on the night that you were piloting the ATHOS into the Citgo dock did you expect that an object the size of the object that I'm pointing to here in the courtroom over here by the wall would be in the approach to the terminal less than or approximately 900 feet from the dock? A I wouldn't expect any object to be at the bottom of the river. Q Of that size? A Of any size. THE COURT: How about a pebble? THE WITNESS: Well, your Honor, there's obstructions that are marked on the chart that you know about. Having something that size in the river is quite disturbing to a pilot. THE COURT: And it's your testimony you didn't know it was there? THE WITNESS: No, I never, no, never in my wildest dreams.")

<sup>199</sup> Trial Tr. Day 34, December 2, 2010, Betz at 99:12-19 ("Q Do you think any amount of under-keel clearance could have taken into account the possibility of an object like the picture we have here, the life-size picture we have here in the courtroom, to be sitting about 900 feet off CITGO's dock? MR. CALDER: Objection, your Honor, it's speculative. THE COURT: That's what he's asking. Overruled. THE WITNESS: No.")

<sup>200</sup> Trial Tr. Day 17, October 20, 2010, Bolton at 136:3-9 ("Q But, in any event, in your estimation, the object that I'm pointing to, the life-sized picture in the corner of the courtroom here, is not a functioning anchor, is it? A No, it's not. Q Would you expect an object like that to be lying 900 feet in the approach off Citgo's dock? A No.")

<sup>201</sup> Trial Tr. Day 17, October 20, 2010, Bolton, at 139:24-140:2 ("Q Do you think any amount of voyage planning could have taken into account an object like the one that I'm pointing to, in the corner of the courtroom there, off Citgo's dock? A No.")

<sup>202</sup> Trial Tr. Day 25, November 10, 2010, Bergin, at 135:15-136:2 ("Q All right. And in fact striking an object that is projecting at least four to five feet off the bottom, that's not something a mariner can really anticipate, can he, if he's in compliance with the company guidance on under-keel clearance? A Well, I mean, you can anticipate anything, but -- Q Well, reasonably anticipate? A Reasonably anticipate? The ten-percent under-keel clearance is designed to take into consideration -- Q The reasonable -- A -- possibles -- Q -- the reasonable hazards? A -- reasonable possibility, I'll agree with you on that.")

<sup>203</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 176:18-177:8 ("Q Let me try it again. If you determined that a proper under-keel clearance for a particular ship, after taking into account squat and whatever other factors you want to take into account, let's say, for example, is four feet, all right? And you strike an un-charted, unknown submerged object, that is five feet above the bottom, that would be, by definition, an object that was unforeseeable, would it not? A Well, I would say that unforeseeable objects are unknown in our industry, that's why we calculate under-keel clearance and provide for safety margins for unforeseeable objects. Now, if you're going to put specific numbers on it, obviously, if four feet were satisfied, everyone involved, every stakeholder that that was acceptable under-keel clearance and there was some unknown object that exceeded that, maybe under those circumstances, I might have to agree with you.")

<sup>204</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 86:22-87:21 ("Q Do you consider that the decision by the Master to proceed with the docking maneuver to the berth a sound decision? A Yes. Q Why? A Well, I mean, for starters, he was -- you know, he knew he had adequate clearance to keep the vessel from going aground, he knew what the stage of the tide was. He knew that he was within the -- CITGO's berthing window, which, you know, there's -- he testified that he looked at various indicators and could see that the tide was already flooding, meaning it was running upriver, which meant he was within CITGO's berthing window. The other one is, you know, looking

at the MAC transit advisories, the MAC transit advisory for Mantua Creek Anchorage says that you can anchor a ship there with a 37-foot draft, which was six inches deeper than the ATHOS draft. And the significance of that is, you know, when you anchor a ship, you could be sitting there through many, many tides, meaning you're going to sit through low tide. So, it seems that the MAC advisory is saying that if a ship can enter the anchorage to anchor and sit through low tide, a vessel that's moving slowly through the anchorage that's not experienced any squat, because squat would be negligible at that point, should also be able to move slowly through the anchorage and approach the dock.

<sup>205</sup> Trial Tr. Day 34, December 2, 2010, Betz, 100:7-101:13 ("Q So, ten percent, in your opinion, is a ten-percent guideline intended to take into account squat? A Yes. Q And what do you base that on? A Well, I base that primarily on my own experience and the guidelines that we have in our harbor. And, typically, you're going to require a greater amount of under-keel clearance when vessels are moving at a faster speed because you know that, as speed increases, so does squat. But you also know that, as speed -- as you decrease speed, squat pretty much goes away, the increase in -- you know, the sinkage due to squat pretty much disappears. And so it's typical to have a lesser amount of under-keel clearance requirement once you get in areas where you're typically running at less speed, such as maneuvering in the approaches to the berth or the inner reaches of a harbor. Q Are you familiar with guidelines that reduced the under- keel clearance guideline from ten percent to five percent

when a vessel is maneuvering, for instance, to a berth? A I have seen that. It's a fairly common approach where you've got a ten-percent requirement in general and you drop to a five-percent; I've also seen it drop to a numerical value, that's what we do in Los Angeles. Q You mean a specific amount of feet? A Yes, 1.5 feet is what we drop to in Los Angeles. Q In your understanding, why would a vessel operator drop the under-keel clearance requirement from ten percent at speed to five percent when maneuvering? A It's because when you get down to low speeds when you're maneuvering there's no longer any squat on the vessel, the vessel is no longer sinking due to squat at all, and basically you're static draft is your draft.")

<sup>206</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 105:14-16 ("Q Do Panamax ships maneuvering slowly with tugs experience a squat factor? A Not practically speaking, no.")

<sup>207</sup> Trial Tr. Day 13, October 13, 2010, Brooking, at 80:1-12 ("Q Okay. Well, what would, since a voyage plan is berth-to-berth, what was the UKC that this master had to use to calculate his safe passage through the anchorage and to the berth? A I don't know, but normally, in maneuvering situations, you do not use a 10 percent clearance, because the 10 percent clearance makes an allowance for what is called squat, where the vessel trims usually by the stern, when travelling up or near full speed. When the vessel's weight comes off, and she slows down in the case of being swung, there would be no squat, and that roughly equates to about 5 percent of the 10 percent UKC.")

<sup>208</sup> Trial Tr. Day 15, October 18, 2010, Hajimichael, at 85:11-19 ("Q What was the company's recommended guideline at that time for the under-keel clearance for vessels that were approaching -- were moving slowly and approaching a dock or were going to be alongside a dock? A If I recollect, it was five percent of the vessel's

16 actual draft at the time. Q And is that five-percent under-keel clearance standard in the industry? A Yes, it's very much standard.")

<sup>209</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 100:4-101:13 ("have a lesser amount of under-keel clearance requirement once you get in areas where you're typically running at less speed, such as maneuvering in the approaches to the berth or the inner reaches of a harbor. Q Are you familiar with guidelines that reduced the under- keel clearance guideline from ten percent to five percent when a vessel is maneuvering, for instance, to a berth? A I have seen that. It's a fairly common approach where you've got a ten-percent requirement in general and you drop to a five-percent; I've also seen it drop to a numerical value, that's what we do in Los Angeles. Q You mean a specific amount of feet? A Yes, 1.5 feet is what we drop to in Los Angeles. Q In your understanding, why would a vessel operator drop the under-keel clearance requirement from ten percent at speed to five percent when maneuvering? A It's because when you get down to low speeds when you're maneuvering there's no longer any squat on the vessel, the vessel is no longer sinking due to squat at all, and basically you're static draft is your draft.")

<sup>210</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 98:1-8 ("THE COURT: What was the vessel traveling

immediately before it struck the anchor? THE WITNESS: Beyond the scope of my report, your Honor, but it would have been very slow, I'm sure. THE COURT: And then squat had nothing to do with it, right? THE WITNESS: Unless there were currents in the river that were contributing.")

<sup>211</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 117:1-11 ("Q Okay. So ATHOS 1 comes up the river, comes to the approach to Citgo's berth, has tugs alongside, and is being maneuvered to the berth in the approach to the berth. How much under keel clearance is adequate for the ship at that time? A Well, the under keel clearance is set by the company -- Q How much -- A -- in this particular case. Q -- under keel clearance do you think was adequate? A You're outside the scope of my report, and you're doing hind-casting. I looked forward.")

<sup>212</sup> Trial Tr. Day 25, November 10, 2010, Bergin, at 133:20-134:15 ("Q All right, I'll accept that. So, she's making the turn, but she's got no squat, does she? A Well, she might. Q She might? A In a turn, especially if you're accelerating. Accelerating will cause shift to squat. Q Well, how fast is she going -- I mean, how fast can she be going, Captain? A Not very much, maybe a knot or so. Q All right. So, that's not going to generate any real squat? A Acceleration could cause some squat, but not much -- Q Not much, all right. A -- I agree, not much.")

<sup>213</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 15:1-3 ("Q Can you estimate your speed at the point where you left the channel and entered the anchorage? A Less than two knots.")

<sup>214</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 15:14-16 ("Q At the speed you were moving as you entered the anchorage did you consider that squat could be a problem? A Not at the speed in which we were traveling at.")

<sup>215</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 36:10-19 ("Q Now, at this time, when the ship has been turned and we're seeing the stern coming into view -- A Yes. Q -- how fast is the ship moving at this time? A At zero, almost zero. When turn is zero. 1 knot must be. Q And would the ship be experiencing any squat as it's moving sideways with such a slow speed? A No, no, no. Sideways, no, there is not any squat at that time.")

<sup>216</sup> Trial Tr. Day 15, October 18, 2010, Markoutsis, at 47:9-12 ("Q And squat increases more dramatically when a ship is being pushed sideways, as compared to when a ship makes way in a forward or aft direction, correct? A I don't know that.")

<sup>217</sup> Trial Tr. Day 15, October 18, 2010, Markoutsis, at 47:17-49:8 ("MR. WHELAN: This is the Captain's deposition. THE COURT: Illegible. MR. WHELAN: Okay. Could we focus in on Lines 20 -- I'm sorry, 5 through 24? BY MR. WHELAN: Q And the question is, "Is the squat increased more dramatically when the ship is being pushed sideways" -- THE COURT: I'm sorry, I can't hear you and I can't read what's on the -- MR. WHELAN: Okay. I'll go slowly, your Honor. BY MR. WHELAN: Q The question is, "Is the squat increased more dramatically when the ship is being pushed sideways as compared to when it makes its way in a forward and aft direction?" The answer: "I don't know that, every vessel has its own -- every vessel presents its own draft. After standing every vessel, you can see the difference between the side draft, the bow draft and the aft draft -- the squat, not the draft, sorry -- it's the side squat, the bow squat and the aft squat, and I agree with what you say." Is that correct? A Yes, but -- Q Okay. A -- I don't understand what it means. Q Okay. "And then the question is" -- THE COURT: Boy, that's really clear. MR. WHELAN: All right. (Laughter.) BY MR. WHELAN: Q -- "that it increases more dramatically when the ship is being pushed?" MR. WHELAN: If we go to the next page, 1 through 7. BY MR. WHELAN: Q Answer: "Yes, yes. "For example, when a tug is pushing the ship with the center line of the tug being perpendicular to one of the sides of the vessel?" Answer: "Yes, I know." So, would you agree with that was your testimony when I asked you about the question at your deposition? A Yes, sir, this is what I say, yes.")

<sup>218</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 105:14-22 ("Q Do Panamax ships maneuvering slowly with tugs experience a squat factor? A Not practically speaking, no. Q Are you familiar with a phenomenon known as sideways squat? A No. You know, I've heard that discussed, I really don't -- for practical purposes, I don't believe that exists. Q Have you ever experienced it -- A No.")

<sup>219</sup> Quillen Dep., September 2, 2010, at 11:10-12:9 ("Q. Do you recall what the purpose of the meeting was? A. Citgo wanted us to open the window for docking operations so they could bring their ships in more frequently instead of waiting for the tides that we had presently at the time. Q. Do you recall how, to what extent, Citgo wanted to open its docking window? A. Well, they said they wanted to come in at any time for ships and -- MR. WHELAN: Objection. VIDEOGRAPHER: Now going off the video record at 2:13 p.m. MR. WHELAN: I object to that on hearsay, they said. Mr. Quillen VIDEOGRAPHER: Going back on the video record at 2:13 p.m. BY MR.



O'CONNOR: Q. You can answer. A. They wanted us to open the window for docking so they could bring their ships in without any delay and that's the reason that the meeting was called."

<sup>220</sup> Quillen Dep. September 2, 2010, at 11:10-16 ("Q. Do you recall what the purpose of the meeting was? A. Citgo wanted us to open the window for docking operations so they could bring their ships in more frequently instead of waiting for the tides that we had presently at the time. Q. Do you recall what the purpose of the meeting was? A. Citgo wanted us to open the window for docking operations so they could bring their ships in more frequently instead of waiting for the tides that we had presently at the time. Q. Do you recall how, to what extent, Citgo wanted to open its docking window? A. Well, they said they wanted to come in at any time for ships and -- MR. WHELAN: Objection. MR. WHELAN: I object to that on hearsay, they said. BY MR. O'CONNOR: Q. You can answer. A. They wanted us to open the window for docking so they could bring their ships in without any delay and that's the reason that the meeting was called. Q. Did Citgo provide you with any information in connection with that request? A. They showed us a set of soundings to substantiate their request and they -- you know, they wanted to actually -- certain drafts they wanted to come in at any time and so I told them I would take it back to our fellows and look at it. Q. Okay. Did you look at the soundings? A. Yes, I did. Q. Did you circulate the soundings to any of the other docking pilots that were members of the association? A. Yes, I did. Q. By the way, how many docking pilots are in the -- were in the Docking Pilots Association in 1999? A. I would say there was probably 16. Q. Okay. And how many are in it today? A. 14. Q. I'm going to show you another document and ask you if you recognize this. A. Yes. Q. Okay. This is -- appears to be a memo on the Docking Pilots Association letterhead to All Pilots from Virgil Quillen, dated August 5, 1999, and I would like to mark this as Quillen Trial Exhibit No. 2. (Exhibit Quillen Trial 2 marked for identification.) BY MR. O'CONNOR: Q. Captain Quillen, why did you send this memo to the pilots? A. I wanted to get feedback from all our pilots, see what -- if they thought it was a good idea to open the window. Q. Did you, in fact, receive feedback from some of the pilots? A. Yes, I did. Q. I'm going to quote for you this third sentence from this memo which says: "Generally most feel that vessels 37.6 feet or less can dock any time on the flood, bow down until one hour after high-water Billingport Range head to the current." Okay. I want to make sure that we understand what everything in that sentence means. You say vessels 37.6 feet or less. Do you see that? A. Yes, I do. Q. What does the 37.6 feet refer to? A. The draft of the vessel. Q. Okay. And you say: "Can dock any time on the flood." What does on the flood mean? A. The flood means the current is coming in. A rising tide basically. Q. Okay. The next phrase in that sentence is: "Bow down." What does that mean? A. It means we would turn the ship around and the bow will be headed south. Q. Is there a reason why you want -- Mr. Quillen why most feel that vessels should be docked bow down? A. Well, we felt that it was better tie-up, plus the fact that the head to the current was turned around. Q. What do you mean by better tie-up? A. That particular berth, it had better a tie at bow down. Citgo actually referred me with a port side too. Q. It was easier to tie the vessel up -- A. Yes. Q. -- bow down? A. Uh-huh. Q. Okay. You go on to say: "Until one hour after high-water." What does high water mean? A. High-water is the rise of the tide. It refers to tides. Q. Is high-water the maximum high tide? A. Yes. Q. Okay. And then you use the words: "Billingport Range." Can you just tell the Court what that is? A. That's the range that's right there by Citgo. We use that as a reference point for the tide. Q. Okay. And again you say: "Head to the current." What does that mean? A. Well, head to the current means just that. If for reasons unknown that the current changes before you get alongside and it starts to go out, that we put the ship starboard side too. Q. So, essentially, your preference or the preference is that the bow is always -- A. Down.")

<sup>221</sup> Quillen Dep. September 2, 2010, at 54:23-57:15 ("Q. Okay. And you state in the letter: "I have spoke to several of our pilots and generally it's felt that vessels 37.6 feet or less could be docked any time on the flood bow down until high-water first of the ebb bow up," correct? A. Correct. Q. Okay. And so this new recommendation that you were working on at this time or new guideline, you ran this by your pilots? A. Yes. Q. And as a result of that they generally gave you positive feedback. Am I correct? A. Correct. Q. Okay. And you had asked them, your pilots, if you skip down two sentences, where it starts with: "Please take the time." Do you see that? A. Yes. Q. It says: "Please" -- you say: "Please take the time to look at these -- to look these soundings over and get back to me." And then the next sentence says: "We should respond as an association as soon as possible." So you invited their feedback, whether it be positive or negative, correct? A. Correct. Q. And because you wanted to put out your guidelines as an association and make sure you had the agreement of all the pilots? A. Correct. Q. Now, if we -- if you could look at Quillen Trial Exhibit 2, which was marked -- I have them. I'll hand them to you. Okay? In Quillen Trial Exhibit No. 2, if you look at the third line down from the top, you state: "Generally most feel that the vessels 37.6 feet or less can dock any time on the flood, bow down until one hour after high-water Billingport Range head to the current," correct? A. Correct. Q.

Okay. And again, you're referring to -- when you put this information out, these proposed guidelines to your pilots, you wanted their feedback and generally they agreed with the sentence that I just read, correct? A. Correct. Q. And then you, again, at the -- in the last sentence of that August 5, 1999 memo to all of your pilots state: "I will wait until early next week to send the letter, so if you have any other comments let me know soon," correct? A. Correct. Q. And again, you wanted to be sure that everyone was on board with the new guidelines, correct? A. Correct. Q. And because you issued them, everyone was on board, correct? A. Correct.")

222 Quillen Dep. September 2, 2010, at 58:13-59:10 ("Q. Okay. And then in the last paragraph of that letter you state -- you stated, on August 11, 1999: "We intend to continually monitor the effectiveness of these guidelines and make amendments as we deem necessary," correct?

A. Correct. Q. And you continue -- you did continually monitor the effectiveness of these guidelines as you stated, didn't you? A. Yes, we did. Q. Okay. And you -- if you deemed it necessary, you would have made amendments to Mr. Quillen these guidelines. Am I correct in that? A. Correct. Q. And from the date of this letter, August 11, 1999, up to the November 26, 2004 -- that's the date of the incident -- you, in fact, didn't make any amendments to those guidelines; is that correct? A. Correct.")

223 Trial Tr. Day 6, September 29, 2010, Capone, at 127:25-129:1 ("THE COURT: Am I to understand that when the tide rises, it does not remain in its risen condition for very long, that when you get down to the low point, it immediately reverses and starts filling up, or does it remain low for a period of time? THE WITNESS: The rate of change at the low and the high is slower, and here on the Delaware River that -- that slack period is -- and "slack" refers to current -- but let's say the low water period is -- is relatively short. It's not a -- THE COURT: Less than two weeks, but what do you mean "relatively short"? THE WITNESS: Thank you. We're talking on the order of literally the lowest reading will only be for somewhere on the order of possibly 12 to 24 minutes, if that. Sometimes the lowest reading is only at one six-minute interval, and it varies with the phase of the moon, environmental conditions, but the, you know, the period on the Delaware River is not very long. BY MR. LEVY: Q What's the rate of change for the tidal cycle? A Just, in general, if you had -- either the tides change every six hours, and if you had 6 feet of tidal change, you're going to change approximately one foot per hour, but you have to understand, as I stated earlier, that at the low tide and the high tide, those change at a slightly different rate.")

224 Trial Tr. Day 21, November 3, 2010, Cole, at 56:4-17 ("THE COURT: How does the tidal current affect the depth of the water? THE WITNESS: It's associated with the rising and falling, so there's a linkage between the two, but there's often -- there's not always a standard difference in time between the two occurrences. For example, the water can start rising before the -- the current begins to flood, and vice versa also, and that relationship varies from location-to-location. The relationship between the height, the tidal height extreme, and the tidal current extreme, it varies from location-to- location, as well as from time-to-time within the same location, and that's why it's important to -- to calculate what the predicted tide is for a particular time.")

225 Trial Tr. Day 8, October 4, 2010, Bethel, at 61:11-17 ("Q This is another one of the Docking Pilots guidelines for Citgo, Paragraph C. "Vessels with a draft greater than 37 feet six inches shall be required to dock between three hours before high water until high water Billingsport Range." Is this the guideline that you applied to all those prior ships before the ATHOS? A Yes.")

226 Trial Tr. Day 8, October 4, 2010, Bethel, at 76:9-17 ("Q -- the docking pilot guidelines in the book that we looked at earlier were merely guidelines and it was up to each individual pilot to decide whether or not to follow them, right? A It's pretty much a guideline that most of the pilots follow. Where there's windows that the companies from the refineries agree to with the tugboat companies in order to get their vessels in and out of the berths faster, this booklet is what I base my docking upon.")

227 Trial Tr. Day 8, October 4, 2010, Bethel, at 76:18-23 ("Q Okay. Did you consider that you had authority to decide whether or not to follow a guideline in a particular case? A Well, each job's different depending on the tugboats you have, the weather, the vessel itself. You have to have a very good reason not to follow those guidelines or else you won't have a job.")

228 Trial Tr. Day 8, October 4, 2010, Bethel, at 55:25-56:6 ("Q And none of those ships ever went aground or contacted anything in the Federal anchorage, right? A I don't know. Q I'm asking about the ones you were on? A

*I could have touched that anchor and not opened up the ship. I never felt it when I did so I don't know if I could have contacted it before and just not put a hole in it.")*

<sup>229</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 51:25-52:3 ("Q If you were taking the ship in starboard side to would you do the same maneuver in the Federal anchorage that you did in this case? A Yes, but I wouldn't turn the ship around.")

<sup>230</sup> Trial Tr. Day 27, November 16, 2010, Daggett, at 137:1-13 ("Q Did Tsakos establish a minimum under keel clearance for the ATHOS in the Vessel Operation Procedures Manual? A Yes, at the bottom of the page, the last paragraph on the first page there, they define that the maximum water depth is 110 percent of the maximum draft of the vessel, which means that 10 percent is the under keel clearance that was recommended. THE COURT: But they make an exception for in-harbor transits with -- THE WITNESS: They -- THE COURT: -- alongside or right alongside. THE WITNESS: -- they do suggest that this could be reduced to 5 percent. Yes, sir, they do.")

<sup>231</sup> Trial Tr. Day 16, October 19, 2010, Johnson, at 187:14-21 ("Q And so the written under keel clearance guidance that was required by this statute, the United States Coast Guard Regulation, was set forth in your VOPB13 section of your Vessel Operations Procedures Manual where you set forth under keel clearance requirements of 10 percent under certain circumstances, and 5 percent under other circumstances, correct? A That's correct.")

<sup>232</sup> Trial Tr. Day 15, October 18, 2010, Hajimichael, at 85:11-19 ("Q What was the company's recommended guideline at that time for the under-keel clearance for vessels that were approaching -- were moving slowly and approaching a dock or were going to be alongside a dock? A If I recollect, it was five percent of the vessel's actual draft at the time. Q And is that five-percent under-keel clearance standard in the industry? A Yes, it's very much standard.")

<sup>233</sup> Trial Tr. Day 16, October 19, 2010, Hajimichael, at 76:13-22 ("Q All right. In your direct examination you testified about 5 percent UKC. Isn't it correct that the Tsakos policy is 10 percent? A No, the procedure -- the under keel clearance under our procedures for vessels berthing is 5 percent. Q Vessels berthing. So vessels approaching is 10 percent? A Vessels within the berthing area is 5 percent. Q And vessels outside the berthing area is 10 percent? A While it's maneuvering to go alongside within the port area it is called, it's 5 percent.")

<sup>234</sup> Caro Dep. dated October 18, 2006, at 178:11-180:23 ("What was that? What was the minimum? A. Five percent. Q. Five percent? A. In harbor, during transit. Harbor. Q. Could you look at the Vessel Operation Procedures manual. MR. KUFFLER: That's 000729. MR. DeGIULIO: 729. BY MR. DeGIULIO: Q. At the bottom of this page, I'll read it into the record. It says, It is normal to consider a water depth of approximately 110 percent of the maximum draft is adequate for a moored, anchored or very slowly moving ship. However, in certain cases, and in particular during in-harbor transits or while alongside, it may be necessary to reduce the clearance fuel still. An underkeel clearance of approximately five percent of the vessel's maximum draft is adequate for these circumstances. However, strict attention must be taken into account for the above conditions A though I. Did you follow this instruction when you prepared voyage plans-- A. Yes, sir. Q. -- aboard the ATHOS? A. Yes, sir. Q. And you considered five percent to be adequate? A. Yes, sir. Q. That's the way you interpreted that instruction? A. Yes, sir. Did anyone from Tsakos ever review this particular instruction with you? (Question is translated). THE WITNESS: From ATHOS? BY MR. DeGIULIO: Q. From Tsakos. A. Yes, the superintendents that went up. Q. Okay. Do you know the names of the superintendents? A. I don't remember the names,

sir. Q. When did they review this instruction with you? A. Can you repeat, sir? Q. When did the superintendents review this instruction with you? When? A. I don't remember when. Q. Okay. And did they tell you that five percent underkeel clearance was satisfactory? A. Yes, sir.

<sup>235</sup> Trial Transcript, October 4, 2010, Day 8, Bethel, at 42:10-12 ("Q The ship's not required to hire a docking pilot in this river, isn't that right? A If he wants tugs he has to hire a docking pilot.")

<sup>236</sup> Trial Transcript, October 4, 2010, Day 8, Bethel, at 76:6-23 ("Q As far as you were concerned -- MR. DeGIULIO: Take this down, please. BY MR. DeGIULIO: Q -- the docking pilot guidelines in the book that we looked at earlier were merely guidelines and it was up to each individual pilot to decide whether or not to follow them, right? A It's pretty much a guideline that most of the pilots follow. Where there's windows that the companies from the refineries agree to with the tugboat companies in order to get their vessels in and out of the berths faster,



this booklet is what I base my docking upon. Q Okay. Did you consider that you had authority to decide whether or not to follow a guideline in a particular case? A Well, each job's different depending on the tugboats you have, the weather, the vessel itself. You have to have a very good reason not to follow those guidelines or else you won't have a job.")

<sup>237</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 63:8-64:8 ("Q How did you derive the actual times and the actual heights of the high and low tides at Billingsport Range from the information that's available through the NOAA PORT System. Q There was not a tide station operating at Billingsport Range at that time. There was one back in about 1985, but there wasn't one at that time. So based on an analysis of various tidal data available from NOAA, I determined that the best station -- really the closest station that was operating, and also the best closest in tidal range and tidal characteristics was the Marcus Hook Station. So I used the Marcus Hook Station, and based on an analysis of the tidal data, I used a correction of 45 minutes, and increasing in range of 1.03 for the height to derive the actual time based on the actual observations at Marcus Hook. THE COURT: Well, now, does this table relate to Marcus Hook or to Billingsport Range? THE WITNESS: They have been corrected. These times and heights have been corrected. The times have been corrected by 45 minutes and the heights have been multiplied by 1.03. So they do reflect the predicted natural tides at Billingsport Range. But there was no tide gauge operating there, so it -- THE COURT: This was Marcus Hook corrected for Billingsport? THE WITNESS: That's correct, your Honor.")

<sup>238</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 72:4-7 ("Q So when the ATHOS entered the Federal Anchorage, the flood tide current had not yet started, based on the NOAA predictions, right? A That's correct, based on the NOAA predictions.

<sup>239</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 123:18-124:15 ("Q Am I correct in saying that all of the opinions that you've given about the current in the river are predicted currents? A That's correct, predicted based on, as indicated in the NOAA table, from the Delaware entrance reference station. Q And are predicted currents like predicted tides, they can vary in both the velocity and the direction from what is actually observed? A Yes, they can. Q And are there tolerances on the predictions? A There's tolerances, but it can vary -- it can vary just like the heights can vary. The current can vary also. I don't -- I don't have a precise figure to give you. Q Oh, well, your opinion that at 20:48 the current was ebbing at 2 knots, were you intending to say -- A 2/10ths of a knot. Q 2/10ths of a knot. Were you intending to suggest that that's what the current was actually doing at that time? A No. As I indicated in my testimony, that was the predicted -- Q Ah. A -- direction and speed of current.")

<sup>240</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 125:20-23 ("Q Okay. Now, we're talking about currents. All your opinions on currents are simply predicted currents, what might have happened? A Right.")

<sup>241</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 124:6-15 ("Q Oh, well, your opinion that at 20:48 the current was ebbing at 2 knots, were you intending to say -- A 2/10ths of a knot. Q 2/10ths of a knot. Were you intending to suggest that that's what the current was actually doing at that time? A No. As I indicated in my testimony, that was the predicted -- Q Ah. A -- direction and speed of current.")

<sup>242</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 125:1-5 ("Q Well, you determined that at 20:31 the current was ebbing at .5 knots at Billingsport Range, correct? A That's correct. Q And, again, that was simply a prediction? A That's a predicted direction and velocity of the current.")

<sup>243</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 125:20-126:8 ("Q Okay. Now, we're talking about currents. All your opinions on currents are simply predicted currents, what might have happened? A Right. Q All right. You don't know for a fact whether the tide was ebbing or not ebbing when the ship left the Federal Anchorage to make its approach to Citgo's berth? A No. There was no current meter operating in the river that -- that had a valid relationship to the anchorage, so there was no, unfortunately no observations taken that would allow an informed estimate of what the actual tide was, actual current was. Q All right. So you don't know? A Right").

<sup>244</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 43:24-44:12 ("Q Now, I'm sorry. What was the stage of the tide when Bethel took over? A It had started to actually rise and the tide had started to flood inbound. Q How do you know that? A I saw it on the buoys. Q Well, what -- when you look at a buoy, what do you see that tells you it's a flood tide? A It's a trail off the buoy. Q Okay, do you remember in particular, what buoys you looked at? A I looked at Buoy 5-T, on Tinnicum, which is Number 10. Q What else? A I-F on Fort Mifflin.")

<sup>245</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 61:7-10 ("Q Mr. Teal, what information did you derive by looking at Buoys 5-T and 1-F near Paulsboro? A I saw the wake on the buoy and the flood current starting.")

<sup>246</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 8:4-9:20 ("4 Q On the night of the 26th did you observe what the tide was actually doing that night? A Yes, I did. When I boarded the tugboat, the SURREY MORAN, from the Naval Base I looked at the jetties, the buoys. I also looked at --THE COURT: Well, excuse me. The buoys wouldn't tell you the depth of the water, would they? THE WITNESS: No, they would give you the current if you look for a tail on either side of them. I also looked at the shoal above Tinicum Island to see if there was a greater exposure than normal. Sometimes if the wind blows for three, four days out of the northwest you'll see much more of the shoal pronounced than what was that night which was about the same as normal for low water right there at the upper end. BY MR. O'CONNOR: Q That's all I have for that. Where did you board, where did you hop the tug to go down to the ship? A At Pier 2 Navy Yard. Q That's the Navy Yard that we've indicated as No. 1 in the chart? A That's correct. Q Okay. And now back to the -- can you show us where you met the ship? A No. 2 there. Q And that's the upper end of Tinicum Range? A Yes. Q Okay. Now you mentioned that you look at the shoal on Tinicum Island, is that what we've marked as No. 3? A That's correct. Q Were you able to see that? A Yes. Q How was visibility that night A Excellent. Q Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? A No. Q Did it appear normal to you? A Approximately. Q Okay. So did the ctual tide give you any concern about the upcoming maneuver that you planned to take? A No.")

<sup>247</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 93:20-25 ("Q Did you observe whether the tide was flooding when you boarded the ATHOS at Billingsport Range? A At the end of the range it was flooding, yes. Q And how were you able to tell that? A I wouldn't have been able to turn the ship to starboard if it was not flooding.")

<sup>248</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 94:1-16 ("Q No, did you, were you able by reference to any visual landmarks were you able to confirm that the tide was flooding? A On 1F there was a little bit of a tail. Q A wake behind the buoy? A A tail that's not a wake but a -- THE COURT: That's the opposite of a wake. THE WITNESS: Yeah, it's a like in a stream if you were to put a stick in the stream and you were -- you're able to tell the direction which the stream is flowing by the water makes a ripple effect behind the stick. It's the same as with a buoy. BY MR. O'CONNOR: Q And this indicated to you that the tide had already begun to flood? A Yes.")

<sup>249</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 25:5-10 ("Q Okay. And when you took the ATHOS, when you proceeded with the maneuver to the dock had the flood current begun? A Yes. Q Okay. A I would not be able to turn the ship to the starboard if it had not begun.")

<sup>250</sup> Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 93:20-25 ("Q Did you observe whether the tide was flooding when you boarded the ATHOS at Billingsport Range? A At the end of the range it was flooding, yes. Q And how were you able to tell that? A I wouldn't have been able to turn the ship to starboard if it was not flooding.")

<sup>251</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 43:24-44:14 ("Q Now, I'm sorry. What was the stage of the tide when Bethel took over? A It had started to actually rise and the tide had started to flood inbound. Q How do you know that? A I saw it on the buoys. Q Well, what -- when you look at a buoy, what do you see that tells you it's a flood tide? A It's a trail off the buoy. Q Okay, do you remember in particular, what buoys you looked at? A I looked at Buoy 5-T, on Tinnicum, which is Number 10. Q What else? A 1-F on Fort Mifflin. Q Am I pointing to the right place? A That's correct.")

<sup>252</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 13:19-21 ("Q Do you remember, I think you said you boarded the vessel at about 8:30? A That's correct.")

<sup>253</sup> Trial Tr. Day 2, September 22, 2010 Teal, at 44:8-10 ("Q Okay, do you remember in particular, what buoys you looked at? A I looked at Buoy 5-T, on Tinnicum, which is Number 10.")

<sup>254</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 5:19-22 ("Q Did he give you an estimated time and place where you were to meet the ATHOS? A Yes, approximately 20:30 at the upper end of Tinicum range.")

<sup>255</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 13:19-21 ("Q Do you remember, I think you said you boarded the vessel at about 8:30? A That's correct.")

<sup>256</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 117:22-118:19 (“Q What opinion have you formed, Mr. Capone? A That the tide was approximately between .2 and .7 feet MLLW. Q At what time? A Between 9:00 and 9:06. THE COURT: And MLLW is something? Does that mean low water or what? THE WITNESS: Yes, your Honor. To be exact, it's an acronym for mean lower low water, which is the average lower low water. That's the lowest level in a two-cycle day over a 19-year period. We use that as the zero for tide measurements. BY MR. LEVY: Q Okay. Was the tide rising at that time? A Yes, it was. Q And do you have an opinion as to how long the tide had been rising? A Approximately one hour. Q Was there anything unusual about the tide on November 26th, 2004? A Yes -- I'm sorry -- no, there was not. Q Was the tide running significantly below MLLW? A No, it was not.”)

<sup>257</sup> Trial Tr. Day 34, Betz, at 170:3-18 (“Q What do you know about this particular issue, as an expert? Do you know of any evidence that the master was aware that the vessel was entering this anchorage at the beginning of the flood current, as opposed to 50 minutes after flood current had started? A No. MR. O'CONNOR: Same objection. THE WITNESS: I don't recall reading anything, in any of the testimony, that asked the master that question, so, I don't know what he was thinking. But I find it fantastic to think that he couldn't see that, because, I mean, all you have to do is look out the window and you can see it's flooding. I mean and Bethel could tell it was flooding by the way the ship turned. He even made the statement that if the current wasn't flooding, he wouldn't be able to turn the ship.”)

<sup>258</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 118:2-8 (“THE COURT: And MLLW is something? Does that mean low water or what? THE WITNESS: Yes, your Honor. To be exact, it's an acronym for mean lower low water, which is the average lower low water. That's the lowest level in a two-cycle day over a 19-year period. We use that as the zero for tide measurements.”)

<sup>259</sup> Trial Tr. Day 21, November 3, 2010, Cole, 45:7-46:22 (“Q What's the importance of the tidal datum mean lower low water in this case? A Mean lower low water is the datum that's used on all nautical charts of the United States, both by NOAA and by the British Admiralty. All the depths that appear on the chart, all the charted depths are the depths that would be at the time of mean lower low water. So, obviously, the actual depth at any specific time would have to be corrected for the stage of time, so this obviously important for predicting safe under keel clearance. Q And -- THE COURT: Well, excuse me. Just refresh my recollection. What's the definition of lower low? THE WITNESS: Yes, sir. Mean lower low water -- THE COURT: Does it go from higher low or is it -- THE WITNESS: Yes, sir. Each day, at least on the East Coast of the United States, that are two tides, two highs and two lows. There's -- in one low there's an inequality between the two -- THE COURT: Oh, so this is the lower of the two, whichever it happens to be. THE WITNESS: Yeah, so the average of the lower of the two, whichever it happens to be over a 19-year period, is how mean lower low water is calculated. THE COURT: Thank you. BY MR. DeGIULIO: Q When a mariner calculates a predicted tide height for a particular location from the tables that you've described, how does he or she apply that to this charted depth, the nautical charted depth? A As I previously testified, the depths on the charts are the depths that are there at the time of mean lower low water. Obviously, those depths would vary with the stage of tide, so by using predicted tides, you can determine the correction that needs to be applied. The mariner applies this correction either adding or subtracting, depending on the stage of the tide at that time, to depict the actual charted depth, predicted charted depth at that time, which allows him then to -- with the knowledge of that and where he would be at a specific time, that allows him to predict what the under keel clearance would be.”)

<sup>260</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 118:15-19 (“Q Was there anything unusual about the tide on November 26th, 2004? A Yes -- I'm sorry -- no, there was not. Q Was the tide running significantly below MLLW? A No, it was not.”)

<sup>261</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 87:6-88:2 (“Q Okay. Now, you would agree with me that it's not uncommon for observed tides on the Delaware River to be higher or lower than predicted tides? A I would agree with that. Q In fact, it's fairly common for observed tides to be different from that which is predicted by NOAA in its tide tables for the same location at the same time? A That's correct. Q Observed tides can vary considerably from predicted times and height, and still be within a range of what is expected or normal? A Could you repeat that? I'm not sure what your question is. Q Observed tides can vary considerably from predicted in height and still be within a range of what is expected? A I'm not sure what you mean "what is expected"? Q All right. On the Delaware River, if the predicted height of tide for a particular location at a particular time was .5 feet above MLLW, and the actual tide was .3 feet above, or .3 feet below that predicted height, that would be a fairly common event, wouldn't it? A It would be a common event, yes.”)

<sup>262</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 91:1-12<sup>262</sup> Q This table shows, does it not, Dr. Cole, that for 2 Philadelphia, 90 percent of the observed tides will be within 3 1 foot of predicted low water? Sorry. Let me rephrase the question. This table shows that at Philadelphia, 90 percent of the observed low tides will be within 1 foot of the predicted low water? A It does appear to show that, yes, sir. Q And it shows that at Reedy Point -- and I'm pointing here on the -- that 90 percent of the observed low tides will be within .9 feet of predicted low water? A Yes, sir. ")

<sup>263</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 91:25-97:2 ("Q So it's not uncommon for observed tides to be lower than MLLW on the Delaware River; isn't that also true? A That was my testimony -- MR. LEVY: We can take that down, please. THE WITNESS: -- but there can be variations between actual tides and predicted tides. BY MR. LEVY: Q No. My question is a little different. I'm sorry. I changes pages on you without telling you. It is not uncommon for observed low tides to be less than MLLW on the Delaware River? A Yes, as indicated, the very definition -- Q Right A -- implies that mean lower low water is an average of the low water, so by definition roughly half of the tides that are occur are lower than that for the lower tides, and half of them are above. Q Right. The MLLW is a 19-year average? A That's correct. Q And, so, as you say by definition, it's a mean, and, therefore, half of the low water -- A Roughly half. Q -- roughly half of the low waters are going to be above it and half are going to be below it. In fact, low tides that are 1 foot below MLLW ar not uncommon on the Delaware River; isn't that correct? A I wouldn't know about how common they are, but I would assume they do occur, yes, sir. Q Well, let's take a look at Marcus Hook for 2004, and see if you disagree with me. MR. LEVY: Could we pull up the Marcus Hook data, please? BY MR. LEVY: Q I'm just going to show you a couple of the months in 2004 for Marcus Hook. (Pause.) MR. LEVY: Okay. We're going to have to pull that in much closer so we can see. MR. DeGIULIO: Does this have a Plaintiffs' exhibit number? MR. LEVY: If it doesn't, it will get one in a minute. MR. DeGIULIO: Have we ever seen this one? MR. LEVY: This is the published data. It's on the website for tides and currents. MR. DeGIULIO: Okay. BY MR. WHELAN: Q This is tides and currents. This is NOAA's website for published data, and this is, in particular, for 2004 in the Marcus Hook range. And what I've highlighted here throughout this is the times on November 26th, 2004 -- I'm sorry -- I'm sorry -- this is for the month of January in 2004, where the low tides are below MLLW. So do you see that entry there for -- A Are these predicted or is that observed tides? Q These are observed. MR. LEVY: Could we go back to the first page, and could we pull up the historic data section there? (Pause.) BY MR. LEVY: Q Okay. A Okay. Q Do you see these are verified tides? A Right. Q Okay. MR. LEVY: Now, take that off, please? (Pause.) BY MR. LEVY: Q Now, I'll represent to you, if we counted these together -- A Mm-hmm. Q -- you would find 23 low tides in 2004, in January at the Marcus Hook Range that were below MLLW? A I wouldn't be surprised. During those times, you know, you do have veer-offs and prevailing northerly winds that would create such a situation. Q And if we went to February of 2004, and I can pull that data up if you'd like, we'd find 31 low tides that were below MLLW. Would you be surprised by that information? A No. Q And, in fact, if we did the whole year looking at Marcus Hook, we find 174 low tides that were below MLLW for the Marcus Hook range? A Very good. Q If we -- MR. LEVY: Oh, I'm sorry. You need to pull that one back up again. I'm looking for the lowest of the low tides in this group. Could we pull up just the last entry down at the bottom of this page, please? (Pause.) BY MR. LEVY: Q Do you see the lowest of the low tides here for January of 2004, at Marcus Hook was 2.37 feet below MLLW? A Yes, I do. Q Now, do you see the entry above it where there's one entry where it was 1.39 feet below MLLW? A Yes, I do. Q And one there with 1.97 feet below MLLW? Do you see that? A Yes, I do. THE COURT: He has very good vision. It's amazing. BY MR. LEVY: Q So low tides that are 1 foot below MLLW are not uncommon on the Delaware River; is that correct? A I would think they are not uncommon. And that's precisely why it's important to compare predicted tides with real time tides to determine the correction, so that you can predict safe under keel clearances. Q Did you know before you testified today that the ship did not have access to the internet? A No, but two things; one, there was -- you can access that information via the phone, and also I would presume that the pilots had access. Q Did you know they had a pilot on board? A I've read that in the testimony that there was a pilot on board. Q And you're not a mariner, are you? A No, sir. Q Okay. You've never done passage planning? A Yes, I have. I was the navigator on the ship RANIER. Q Ah, okay. Have you ever done any passage planning for a vessel coming up the Delaware River? A No, sir, I have not. Q Have you ever been in the position of having to make the decision as to whether your vessel should go up the Delaware River on high tide, or low tide, or any tide in between? A I've never voyaged up the Delaware River.")

<sup>264</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23, ("Q Okay. During your trip up the river, did you have occasion to check for the actual tide? A Yes, I did. Q How do you do that? A Just visual cues that have been experienced by me and every other pilot, for years. Q Can you give us a couple of examples of where you might look if you wanted to check to see how the actual tide was running? A I can tell you the ones I used on this



particular ship. *Q* Please do. *A* I started at -- I noticed when we went by Buoy Marker 42 on Liston (ph) range. *Q* Am I pointing to that circle of the area where Buoy 42 is? *A* Yes. *Q* Any others? *A* I noticed Reedy Island bar or Reedy Island range. *Q* Am I pointing to the place on the chart where Reedy Island bar is? *A* That is correct. *Q* Okay. Anything else? *A* And then just above Finn's Point, there's a bulkhead bar around Buoy 2-B or 2-D on deep water. *Q* Is that a fixed navigational marker or float? *A* Which one? *Q* At Finn's Point. *A* That would be a shoal. *Q* Okay. And how about down on 42? *A* 42 is a fixed marker. *THE COURT*: What is the significance of these markers? You said you saw something, how did you see it? *THE WITNESS*: Just the height of the water as they appear on the marker. *Q* Did what you observed regarding the height of water give you any cause for concern? *A* No. *Q* Now, during the course of your trip up the river -- *THE COURT*: In your parlance, is the height of the water, under those circumstances, the same thing as the depth of the water for everybody else? *THE WITNESS*: No, sir, that would just be the range that I would observe between normal high and normal low on a fixed structure. Which I've noticed for 40-some years. *THE COURT*: And what conclusion would you reach? *THE WITNESS*: That is was just a normal falling tide. *THE COURT*: And it was enough (inaudible)? *THE WITNESS*: Yes."

<sup>265</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 59:8-11 ("Q On your direct testimony, you mentioned that you checked the actual tidal height by visual cues going up river, is that correct? *A* Yes, and the ship's pentameter (ph).")

<sup>266</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-18, ("Q And if we could bring up the next exhibit, the staircase? Now, Mr. Kayfetz, this is a demonstrative exhibit showing perspective with the staircase in front of you. And we could draw -- if you assume that the straight horizontal line, across the top, is the horizon line, we're going to be put two blue points on that and connect those lines with a blue point like the horizon line in the video. And if we assume that these two points, at the top of the stairs, are similar to the two points that you were using for the lights and we join those with a red line and go all the way through. Because of perspective, those two lines are not parallel, am I correct in that? *A* Well, the assumption is incorrect, because this viewpoint is from a position, essentially, on top of the stairs. The photographs used of the Athos were -- with the Athos many hundreds of yards away. And so, your assumption, which was a predicate to this question, is incorrect").

<sup>267</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 9:5-20 ("Q Okay. Now you mentioned that you look at the shoal on Tinicum Island, is that what we've marked as No. 3? *A* That's correct. *Q* Were you able to see that? *A* Yes. *Q* How was visibility that night? *A* Excellent. *Q* Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? *A* No. *Q* Did it appear normal to you? *A* Approximately. *Q* Okay. So did the actual tide give you any concern about the upcoming maneuver that you planned to take? *A* No.")

<sup>268</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 64:21-65:9 ("Q Okay. So, you boarded the Athos at what time, 12:20, I22 believe was your testimony? *A* I'd say that sounds correct. *Q* Okay. And you departed the Athos, by launch, at Paulsboro at what time? *A* 8:40. *Q* 8:40 -- *A* I'm sorry, 9:15 to 9:30 that night. *Q* So, that was about a ten hour transit in rough numbers? *A* I didn't realize it was that long. *Q* I'm sorry, I'm sorry, it's roughly a nine-hour transit. *A* Okay, that's better.")

<sup>269</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 68:1-6 ("Q And after the incident you also learned that the actual height of tide measured by the tide gauges in the river showed that the height was in fact one foot less than predicted, just as you had assumed based on your experience, correct? *A* I don't think it was.")

<sup>270</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 130:10-17 ("Q And what opinion did you form? *A* That on average that water depth was 41.4 based on averaging multi-beam data from November 28th and November 29th. *Q* 41.4 feet? *A* Yes. *Q* At MLLW? *A* Correct.")

<sup>271</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 49:17-25 ("Q And how -- did you make a determination of the median depth, based on those two data sets, November 28 and 29, 2004? *A* Yes, both in the 28th and the 29th, I selected points in a ten foot by ten foot box around the anchor and then excluding points that were on the anchor itself, I calculated a median of all the soundings in those ten by ten boxes and then averaged those two medians to come up with a depth of 41.45 feet in the vicinity of the anchor.")

<sup>272</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 83:15-84:23 ("Q You concluded that the verified or the observed tide at 21:02 -- that's 9:02 p.m. -- in the Mantua Creek Anchorage was .26 feet above MLLW; is that correct? *A* I'd like to -- could I see my Table 1 again -- *Q* Yes. *A* -- to confirm that? *MR. LEVY*: Can we put up

Table 1 for him, please? (Pause.) THE WITNESS: At what time are you referring to? BY MR. LEVY: Q I'm sorry. It's not Table 1 you want to look at. A Okay. Q It's -- MR. DeGIULIO: Excuse me, your Honor. BY MR. LEVY: Q You want to look at Table 6. COUNSEL: They're in here if you want to look them up? MR. LEVY: Oh, that would be great. Thank you. COUNSEL: Here's hard copies. MR. LEVY: Okay. Thank you. (Pause.) THE COURT: We're all memorizing this chart, what's your question? BY MR. LEVY: Q Do you agree -- A What was the question? I'm sorry. Q -- that you concluded that the verified or observed tide at 21:02 in the Mantua Creek Anchorage was .26 feet above MLLW? A That is correct. Q And that's about -- you have 3.12 inches; is that correct? A Yes, sir.")

<sup>273</sup> Trial Tr. Day 28, November 27, 2010, Daggett, at 25:22-25 ("Q At that moment. I'm asking you to assume, at that moment when the ship hit the anchor, if it had 4 to 5 feet under keel, then it met its UKC 10 percent guidance? A At that point.")

<sup>274</sup> Trial Tr. Day 25, November 10, 2010, Bergin, at 134:16-135:14 ("Q Now, Captain, if we assume that at the time of the contact she had -- contact with this object she had between four and five feet under-keel clearance, she's in compliance with that ten-percent requirement, isn't she? A I would assume so, as long as she didn't have any list. I understand there were two tugboats pushing full on the side of her hull. Q Well, we don't know exactly what the tugs were doing, do we? A From what I read, they were pushing the ship, that's what I heard. Q All right. You don't know how much, how much force? So, she might have had list, you can't say she did, is that correct? A No, I can't say she did, no. Q All right. So, let's assume that there's four to five underneath her at the point she's closest to the bottom, wherever that is, right? And that complies with the ten-percent under-keel clearance requirement, doesn't it? A Yes, it does. Q All right. And you wouldn't criticize a Master for what happened at that incident -- instant, I'm sorry, at that instant since he's in compliance at that point? A No, I couldn't criticize him for that.")

<sup>275</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 122:16-123:5 ("Well, it's -- if a ship is planning a voyage, and something has happened, there's been another ship that has sunk, and nobody's reported that ship as sunk, and the tanker coming up the river, which was 4 or 5 feet of under keel clearance comes into contact with that sunken vessel that nobody knew about, you certainly wouldn't fault the ship for that, would you? A Assuming there was no report -- Q Yes, there was no report. A -- on the sunken vessel. It would be hard to -- it would be hard to find the fault. THE COURT: He's agreeing with you. BY MR. LEVY: On the part of the ship? A On the part of the ship.")

<sup>276</sup> Trial Tr. Day 24, November 9, 2010, Grenier, at 124:8-24 ("Assume, for the purposes of our discussion, that the ship had 4 to 5 feet of under keel clearance at the time it came into contact with the anchor, okay? You don't need to know where it came into contact. Assume it had 4 to 5 feet of under keel clearance at that time, assume the ship is moving slowly in the approach to the U.S. oil terminal's berth, that it has tugs alongside, that it has -- it's moving slowly so that it has no apparent squat to the vessel, so the under keel clearance was 4 to 5 feet, and the vessel's draft is approximately 36 feet, 6 inches. So 10 percent of 36 feet, 6 inches is 3 feet, 6 inches, correct? A Correct. Q All right. So you would agree that under those circumstances, the ship would have enough or it would have adequate under keel clearance? A I would.")

<sup>277</sup> Trial Tr. Day 24, November 9, 2010, Haley, at 176:18-177:8 ("Q Let me try it again. If you determined that a proper under-keel clearance for a particular ship, after taking into account squat and whatever other factors you want to take into account, let's say, for example, is four feet, all right? And you strike an un-charted, unknown submerged object, that is five feet above the bottom, that would be, by definition, an object that was unforeseeable, would it not? A Well, I would say that unforeseeable objects are unknown in our industry, that's why we calculate under-keel clearance and provide for safety margins for unforeseeable objects. Now, if you're going to put specific numbers on it, obviously, if four feet were satisfied, everyone involved, every stakeholder that that was acceptable under-keel clearance and there was some unknown object that exceeded that, maybe under those circumstances, I might have to agree with you.")

<sup>278</sup> Trial Tr. Day 29, November 18, 2010, Anderson, at 120:14-19 ("Q So, if ATHOS I while it was in the approach to CITGO's berth had a draft in excess of three -- I'm sorry, had an under-keel clearance in excess of 3.6 feet, you would find that that under-keel clearance was adequate, correct? A Provided it was 3.6 feet above the controlling draft of -- controlling depth of where the vessel was going.")

<sup>279</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 71:17-72:7 (Q This information is for a specific time of 20:48. What is the significance of that time? A My understanding is that's the time that the ATHOS left the main channel and entered the Federal Anchorage. Q And what were the predicted and actual tide and current conditions when the ATHOS entered the Federal Anchorage? A At that time, basically it was predicted that you should add



8/10ths of a foot to the charted depth, when in reality the tide was lower than predicted, so you should have subtracted 2/10ths of a foot to the charted depth. At that time the current tidal current was predicted to be ebbing at 2/10ths of a knot. Q So when the ATHOS entered the Federal Anchorage, the flood tide current had not yet started, based on the NOAA predictions, right? A That's correct, based on the NOAA predictions.")

280 Quillen Dep. September 2, 2010, at 58:13-59:10 ("Q. Okay. And then in the last paragraph of that letter you state -- you stated, on August 11, 1999: "We intend to continually monitor the effectiveness of these guidelines and make amendments as we deem necessary," correct? A. Correct. Q. And you continue -- you did continually monitor the effectiveness of these guidelines as you stated, didn't you? A. Yes, we did. Q. Okay. And you -- if you deemed it necessary, you would have made amendments to Mr. Quillen these guidelines. Am I correct in that? A. Correct. Q. And from the date of this letter, August 11, 1999, up to the November 26, 2004 -- that's the date of the incident -- you, in fact, didn't make any amendments to those guidelines; is that correct? A. Correct.")

281 Trial Tr. Day 14, October 14, 2010, Markoutsis at 31:17-32:6 ("Q What questions did you ask him? A I ask him about some areas in the river, which it was danger -- dangers to navigation farther from the ship or near the ship, and I want to -- I want him to explain to me how we avoid this or how to keep away from this dangers, and all this. Q Were you aware that there was one 38 foot sounding at the edge of the river channel in the approach to Citgo's berth? (Pause.) A Yes, sir, I was aware that it was on the south. It was no go area at first, but -- and I informed the pilot, I ask him about this. He told me that there is not any -- not any matter, no matters, it's okay to proceed because this draft is the same draft as the draft alongside Citgo's terminal, so it was not a problem for us to proceed.")

282 Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 13:4-18 ("Q Okay. Now I notice on the chart here up here where we've marked No. 10 and down here where we marked No. 9 that there has been some revisions to the chart, to the depths on the chart? A Yes, that's correct. The -- Q Do you recall whether that was discussed with the captain? A Yes, it was. The captain during our conference had pointed to these on the chart and asked me if we'd be going anywhere near them. I had told him no, that they weren't a concern. And he also pointed to this 38-foot mark and asked if that would be a concern. And I told him an hour into the flood current I did not feel as though it would be a concern. If anything, I was more concerned with the depth of water alongside the jetty.")

283 Trial Tr. Day 8, October 4, 2010, Bethel, Day 8, at 71:19-24 ("You had no discussion with the captain or the pilot about the amount of under keel clearance that would be available during the maneuver through the Federal anchorage, right? A The captain pointed to a 38-foot spot in the anchorage and asked me if that would be a concern. I told him no. I told him I was more concerned with the depths along the side.")

284 Trial Tr. Day 8, October 4, 2010, Bethel, at 10:3-7 ("Q Okay. So if I understand you correctly although you expected that the actual tide at low water might be a foot below predicted, taking into account that you'd be an hour into the flood you would gain that foot back? A That is correct.")

285 Trial Tr. Day 8, October 4, 2010, Bethel, at 74:7-20 (Q To find the actual depth of water at that 38-foot spot, the charted 38-foot spot, at a particular time isn't it correct that you have to adjust that figure for the height of tide at the specific time that the ship's going to go over that spot? A That's taken at mean low or low water. When we crossed that I estimated we had about 45 minutes, 50 minutes of flood. Q Okay. So -- A So it meant that to be at least a foot and a half. Q And so in your mind you estimated it would be something higher than 38 feet because you thought there had been a flood current for a good 45 minutes before that? A Yes.")

286 Trial Tr. Day 21, November 3, 2010, Cole, Day 21, at 72:8-23. ("MR. DeGIULIO: Could we see the nautical chart again, please? Can you zoom in on the anchorage? (Pause.) Could you circle the 38? (Pause.) BY MR. DeGIULIO: Q If the ship passed over this 38-foot charted water depth at 20:48, when it entered the anchorage, what was the actual water depth at that time and location based on your calculations? A May I see chart or Table 1 one more time, please? (Pause.) As you can see at 20:48, the water was actually 2/10ths of a foot below mean lower low water, so that sounding should be corrected by 2/10ths of a foot, so the actual depth would have been 37.8 feet.")

287 Trial Tr. Day 21, November 3, 2010, Cole, at 61:5-17 ("THE COURT: Where do you see 1.1? THE WITNESS: I'm sorry. It was predicted at Billingsport Range at 20:31, predicted to add 6/10ths of a foot to the

charted depth -- THE COURT: Right. THE WITNESS: -- and in actual it was 4/10ths of -- 5/10ths of a foot below. THE COURT: So instead of adding them -- THE WITNESS: So adding those two together, it's 1.1 foot. THE COURT: -- together, you're subtracting. Thank you. THE WITNESS: Okay.")

<sup>288</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-17 ("Q On the night of the 26th did you observe what the tide was actually doing that night? A Yes, I did. When I boarded the tugboat, the SURREY MORAN, from the Naval Base I looked at the jetties, the buoys. I also looked at -- THE COURT: Well, excuse me. The buoys wouldn't tell you the depth of the water, would they? THE WITNESS: No, they would give you the current if you look for a tail on either side of them. I also looked at the shoal above Tinicum Island to see if there was a greater exposure than normal. Sometimes if the wind blows for three, four days out of the northwest you'll see much more of the shoal pronounced than what was that night which was about the same as normal for low water right there at the upper end.")

<sup>289</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 9:5-20 ("Q Okay. Now you mentioned that you look at the shoal on Tinicum Island, is that what we've marked as No. 3? A That's correct. Q Were you able to see that? A Yes. Q How was visibility that night? A Excellent. Q Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? A No. Q Did it appear normal to you? A Approximately. Q Okay. So did the actual tide give you any concern about the upcoming maneuver that you planned to take? A No.")

<sup>290</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 64:22-65:9 ("Q Okay. When you boarded the ATHOS in Billingsport Range you assumed, based on your experience, that the actual height of tide would be one foot lower than predicted because of a full moon, right? A I estimated it could be off as much as a foot. Q Is that what you assume when you formulated your plan to dock the ATHOS? A That's the plan I formulated when I was thinking of the times when I got the call at home and looked at my tide booklet that it was going to be a full moon. But when I reached Navy Yard, you know, I checked the piers, I looked at Tinicum Island's, you know, upper shoal. It didn't seem to be off as much as I thought.")

<sup>291</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 68:1-6 ("Q And after the incident you also learned that the actual height of tide measured by the tide gauges in the river showed that the height was in fact one foot less than predicted, just as you had assumed based on your experience, correct? A I don't think it was")

<sup>292</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 164:24-165:8 ("Is that 38 feet of water there or what? THE WITNESS: That is a 38-foot sounding on a chart. To understand why it was placed on the chart, I looked at the -- the actual data from the U.S. Army Corps of Engineers, and the data that represents that 38-foot sounding is slightly more than 38 feet, and it's actually very small, but because of the way we place soundings on charts, we do it in a more conservative manner, so we use the -- NOAA uses the next full sounding. So if we had that sounding, as I had said, of 38.8 feet on the chart, we show it as 38.")

<sup>293</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 163:10-165:8 ("BY MR. LEVY: Q Okay. I want to show you the British Admiralty Chart 2604. MR. LEVY: If we could put that up on the screen, please? That's P-461. And if we could zoom in on that -- yes, that section right there, and that little 38-foot mark there on the chart. BY MR. LEVY: Q At my request, did you examine what that 38-foot spot was in actuality in the Mantua Creek Anchorage?

A Yes, I did. Q And what did you find? MR. CALDER: Your Honor, I don't believe this was included in his report unless I'm mistaking. COUNSEL: These are in. MR. CALDER: I'm sorry. THE COURT: I'll guess you'll just have to listen to his testimony then. MR. CALDER: Yes, sir. BY MR. LEVY: Q Mr. Capone, what did you find about the 38-foot spot? I'm sorry. Take a drink. (Pause.) A What I did was I got the position of that 38-foot spot and then I went and looked at the U.S. Army Corps of Engineers' multi-beam data. Q Which data was that? A Both from the 28th of November in 2004, and the 29th, to determine why that sounding was placed on the chart, and what I found was a cluster -- a small cluster of soundings between 38.9 and 38.8 feet. Q And how big a cluster of soundings was that -- A Other -- Q -- in diameter? A Other than one outlier, which was further in towards the anchorage proper, that cluster was in a circle of, you know, say 4 or 5 feet. THE COURT: I'm sure everybody else knows what he's

talking about, but I don't. Is that 38 feet of water there or what? THE WITNESS: That is a 38-foot sounding on a chart. To understand why it was placed on the chart, I looked at the -- the actual data from the U.S. Army Corps of Engineers, and the data that represents that 38-foot sounding is slightly more than 38 feet, and it's actually very small, but because of the way we place soundings on charts, we do it in a more conservative manner, so we use the -

- NOAA uses the next full sounding. So if we had that sounding, as I had said, of 38.8 feet on the chart, we show it as 38.”)

<sup>294</sup> Trial Tr. Day 33, December 1, 2010, Bowman, at 63:11-25 (“Q Okay, before we do that, let's look at Tab 7, which is P-464-A. This is the section of the echo sounder printout that Mr. Stoller said that he was relying, in part, upon in forming his opinion that the ship went aground at the 38-foot charted location in the Mantua Creek anchorage. Do you recall that testimony? A Yes, I do. Q Okay. And at your direction, did we write on this, echo sounder cavitation at about 2050, on November 26th? A Yes, I did. Q And what is the -- can we zoom in, yes, thank you, Ted. What is the under-keel clearance that the echo sounder is showing both before and after this cavitation event? A It's just over two meters, that's a two-meter line on the scale of this printout.”)

<sup>295</sup> Trial Tr. Day 14, Markoutsis, at 26:10-27:15 (“Q Was there anything unusual about the river passage on November 26th? (Pause.) A No, sir, it was a very small passage. Q Did you observe any vibrations or other signs that might indicate a problem with under keel clearance due to squat as the vessel came up the river? A No, sir, I don't -- I don't -- nobody on board noticed anything, any vibration or any -- it was a smooth passage. Q Did you notice anything? A No, nothing. Q Okay. A No. Q Were you always on the bridge? (Pause.) A 90 percent of the -- of the passage on the river, during 90 percent. Q What does the echo sounder show you as the river -- as the vessel is coming up the river? (Pause.) A It shows me that the clearance, the under keel clearance was enough. If I remember well, it was a minimum two 2 meters (noise). Q And did you have one of the duty officers assigned to do anything with respect to what the echo sounder was showing? (Pause.) A Yes, sir, because it was night, and the echo sounder was located aft in the draft room, I don't have visual contact with the echo sounder, so I -- I tell to my officer to remain next to echo sounder, and call the under keel clearance every three to five minutes.”)

<sup>296</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 23:5-20 (“A Yes, I was. And also to make a statement, to write a statement and which I did. I faxed it to the lawyer. The lawyer then faxed it back to me and had me make one change. I then faxed the -- made the change and faxed it back to him. THE COURT: Don't leave us there. What was the change? THE WITNESS: That at no time did I ever feel or touch anything with the ship en route from the river into the anchorage did I feel it touch the bottom or hit anything. BY MR. O'CONNOR: Q And that's something, is that something that you believe is true, that you didn't feel the vessel touch the bottom? A I definitely feel it to be true. Q Okay. THE COURT: That you did or did not touch bottom? THE WITNESS: That I did not.”)

<sup>297</sup> Trial Tr. Day 2, September 22, 2010, Esplana, Day 2, at 163:17-165:11 (“Q Did you return to the bridge for your evening watch that day, November 16th? A Yes, at 16:00. Q At 4:00 p.m.? A Yes. Q Whom did you relieve? A I replaced Second Officer Caro. Q Who else was on the bridge with you during this second watch? A The captain, the river pilot, the helmsman and one of the Coast Guards. Q Where was the Athos I when you returned to the bridge for your evening watch? A At the Delaware River. Q When you returned to the bridge for your evening watch, did you continue to put the position of the ship on the chart at five-minute intervals, like you showed us before? A Yes. Q And how -- while you were on the bridge for your evening watch, did the captain review the paper charts on which you were marking the ship's position? A Yes. Q And how frequently did the captain review the charts during your watch? A Frequently. Q Did you have any additional tasks to perform during this watch? A Yes. Q What additional tasks did you perform during your 4:00 to 8:00 watch in the evening on November 26th? A Other than plotting the positions every five minutes, I am also the general lookout and also I monitor the helmsman that they are following the piloting instructions. I also monitor the echo sounder and I relay the information to the captain and the pilot can hear what I am saying. Q What does the echo sounder tell you, generally? A This reads the distances from the keel of the vessel up to the seabed, that's what you would call the under-keel clearance. Q During your 4:00 to 8:00 watch, why did you call out the depths displayed on the echo sounder? A This would be at the back and the curtain is sort of covering it, most especially at night time, so, the captain and the pilot would not see it. So, it is needed after I have looked at it, I need to call it out to them.”)

<sup>298</sup> Trial Tr. Day 2, September 22, 2010, Esplana, Day 2, at 168:5-175:6 (“Q Did the ship experience any under-keel clearance problems during the transit of the Marcus Hook range? A There was none. Q Now, if we could zoom in on the Marcus Hook range, please. And the positions on the Marcus Hook range that are highlighted in yellow, on this diagram that's before -- this chart that's before you, zoom in on those a little. Okay and did you fix those positions on the chart, is that in your handwriting? A Absolutely, yes. Q Mr. Esplana, I'm showing you the original chart from the ship, 2603. Now, looking at the positions that you fixed on the chart, while the ship was passing through Marcus Hook range, could you tell us the times that you fixed those positions? A 19:10, 19:15,

19:20, 19:25, 19:30, 19:35, 19:40, 19:45, 19:50, 19:55. THE COURT: That's every five minutes. Q Did the echo sounder also produce a printed record? A Yes. Q I'm showing you what has been marked as P-464, this is the original of the echo sounder printout, right? A Yes. Q Do you know how to read the echo sounder printer -- printout, sorry. A Yes. Q And could you find, on the echo sounder printout, the page right before the vessel enters the Marcus Hook range? A Yes. Q Okay, now, for the benefit of the Court, can we put up a page of the echo sounder? Mr. Esplana, would you look for the time entry for 7:19 p.m., local time. Is the echo sounder printer time in local time or is it in Greenwich Mean Time? A It's on the GMT. Q Okay, so, it's five hours ahead of local time? A Yes. Q Mr. Esplana, before you find the location that I asked you to find, using your pointer, could you explain to the Court what we're seeing in an echo sounder printer -- on this echo sounder printer? Start with the top, what is this? A This would be the keel of the ship. Q This would represent the keel of the ship? A Yes. Q Okay and the first line here, with the number two next to it, what does that represent? A This would be the distance, the distance is two meters. Q Okay and what are we seeing here with these lines that go up and down? A This represents the seabed that it's reading. Q So, the top line is the keel of the ship? A Yes. Q And then we're going down from the keel of the ship and we have a two-meter line and then the next line, is that a four meter line or six meter line and so on? A Yes. Q Okay, so, we seem to have two sets of bouncing lines here. Can you explain why there's This one on the upper portion, that would be the seabed. And this on the lower portion, this is the multiple echo only. Multiple echo only. Q So, this is a second bounce-back from the echo sounder? A Yes. Q So, can we ignore this bottom series of jagged lines? A Yes. Q Okay, so, the tops of these lines that we're seeing on the echo sounder, do they represent the river bottom? A Yes. Q And just looking at this document, you don't have to look at the printer, just what we have up here on the screen, at this time, what is the under-keel clearance shown on the echo sounder printer? A This indicates three meters. Q Okay and can you tell us what time this is? A This would be 19:19, local time. Q So, 7:19 at night? A Yes. Q And where was the ship, at that time? A It was at the Delaware River, close to Marcus Hook. Q Okay, just before the Marcus Hook range or in the Marcus Hook range? A Before. Q Okay. Now, looking at the echo sounder printout that you have in front of you, can you identify any points on the echo sounder printout, that show the passage through Marcus Hook range? A Yes. Q And what times do you see? A 19:28 at GMT, it's means 19:28 local time. THE COURT: 19:58. THE WITNESS: 19:28 local time. THE COURT: 58, that's what he said twice. MR. LEVY: No, your Honor -- THE INTERPRETER: 28 is what he's saying. MR. LEVY: -- he's saying 20. THE INTERPRETER: 28. MR. LEVY: Okay. Q Would you put up that echo sounder, okay. Mr. Esplana, is this the page that you're looking at? A Yes. Q And does this show the echo sounder printer just as the vessel enters Marcus Hook range? A Yes. Q Okay and what is the under-keel clearance that is being shown on the echo sounder printout, as the vessel is here in Marcus Hook range, at that time? A Three meters. Q Okay. Are there any other depths that are shown from the Marcus Hook range, on the echo sounder printout? A Yes, there is between 19:28 and 19:33, it shows two meters. Q Could we put up the page for 19:33, please? Okay and is that the page that you're looking at? A Yes. Q That echo sounder printing paper, that you have there, is it all one document, just one stream of paper? A Yes. Q Okay and do you see any other times for the ship's passage in Marcus Hook on the echo sounder printer paper that you have in front of you? A 19:38. Q Okay, could we put up 19:38? We're looking at a page from the echo sounder printer paper, from the time of 19:38, is that the page you're looking at? A Yes. Q And how much under-keel clearance is the vessel showing, at this point, according to the echo sounder printer? A Based on the echo sounder, at 19:38, it's around 3.5. Q 3/5 what, sir? A 3/5 meters. Q Okay. Are there any other times in the echo sounder printout paper, where you see the echo sounder giving a reading for the Marcus Hook range? A Yes. Q What time is that, sir? THE COURT: Excuse me, but I'm under the impression that this is a ten-minute reading. MR. LEVY: We're about to find out that the printer went off -- the paper jammed on this, in a minute. So, we don't have entire, the entire range of Marcus Hook on the paper. Q What other time, Mr. Esplana, is shown on the echo sounder printer for Marcus Hook range? A 01:06 GMT. Q Okay and can we see that up on the screen, please? And what is the under-keel clearance that's shown for the vessel, according to the echo sounder printer, at that time? A About three meters. Q Okay, now, while we're on this page, it looks like the line has moved here. It's as if you've got a line here, then another line here. Did you periodically have problems with the echo sounder printer? A Yes, sometimes, once only. Q What was the problem that was happening here with the echo sounder printer? A It was misaligned. Q Now, what would you do if this occurred? A I would then need to switch up the printer, I re-align the paper and after that, I would switch it back on. Q If the printer was offline, did the echo sounder, the device that we looked at before, that gave you the digital reading, did that continue to work? A Absolutely, yes. Q Okay. According to the echo sounder printout, what was the depth under the keel, at the time the printer stopped working? A Four meters. Q And according to the echo sounder printout, what was the depth under the keel, at the time the printer came back online? A Three meters. Q And when did it come back online? A 0 and



06 GMT. It means 20:06 local time. Q So, approximately, how long was the printer offline? A About 28. Q 28 minutes? A 28 minutes.”)

<sup>299</sup> Trial Tr. Day 3, September 23, 2010, Esplana, at 58:5-20 (“Q Mr. Esplana, at the time the ship was being berthed to the Citgo facility on the night of the accident, was the ship under assistance of tugs? A Yes, there were two tugs. Q And were the two tugs moving around the ship as the ship was being berthed in the approach to Citgo’s berth? A One is on the forward, the other one is on the aft, and pushing the vessel. Q Okay. And do the tugboats generate air bubbles as they push on the ship with their propellers? A Absolutely, yes. Q And are these the type of air bubbles that you were mentioning earlier in your testimony that can cause what we’re seeing there on the left side of the echo sounder screen which appears to be the vessel aground? A Absolutely, yes.”)

<sup>300</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 101:8-10 (“Q In November, 2004, what was the project depth in the Mantua Creek anchorage? A 40 feet.”)

<sup>301</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 108:24-109:9 (“Q I would like you to look at a document we’re going to bring up on the screen. This is F-ACE-343. What is this table? A This is a channel statement that the Corp of Engineers develops and puts out to the maritime community. This one is from January, 2004. Q And what general information does a channel statement provide? A The channel statement will provide the minimum depths in a particular range or anchorage in the Delaware River, in certain locations, as depicted on the chart.”)

<sup>302</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 111:13-112:7 (“Q What does this chart say the project depth for the Mantua Creek anchorage is? A 37 feet. Q Is this correct? A That’s wrong. Q And why is it wrong or why is it on the chart if it’s wrong? A Well, it’s just a mistake. The Mantua Creek anchorage was authorized to 40 feet in, like, 1958. So, whoever was drafting this particular form up and that’s the part of the form we generally never change, just put the wrong number down. Q When did the corp last dredge the Mantua Creek anchorage? A The last time we dredged it, well, we did a portion of it in 2009, but before that, the last time was 1984. Q Did the corp ever correct the authorized depth listed on this channel statement from 2004? A Yes. Q When did they correct it? A 2005.”)

<sup>303</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 81:2-82:9 (“Q And on this channel statement there are depths given for each of the four Federal anchorages in the river, right? A Yes. Q And is that something you reviewed as a docking pilot prior to your work on the ATHOS? A Yes. MR. DeGIULIO: If you could highlight the Mantua Creek in yellow, please? BY MR. DeGIULIO: Q This is the Federal anchorage No. 9, right? A Yes. Q Federal Martin Mantua Creek. This channel statement was published in January 2004. Do you see the numbers in the right-hand three columns? A Yes. Q 37.4, 36, 40.4? A Yes. Q What information does that convey to you as a docking pilot?

A Certain soundings in the anchorage. Q Okay. So this channel statement from the Army Corps showed depths of 37.4 feet, 36 feet and 40.4 feet, correct? A Yes. Q Had you looked at this channel statement before you boarded the ATHOS? A I’ve seen it. Q So you were aware that there were depths of 36 feet in the Federal anchorage according to the Army Corps of Engineers? A Yes. Q Did you take that into account when you took the ATHOS into the Federal anchorage on November 26th? A No.”)

<sup>304</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 95:4-12 (“Q You were asked a couple of questions about channel statements and shown some depths in the Mantua Creek anchorage 36, 37 foot depths, where are they in the anchorage? A The northern end of the anchorage where the tug and barges anchor up off of the Amer (ph.) dock. Q When you berth a ship at Citgo do you have any reason to go into those areas at the northern end of the anchorage? A No.”)

<sup>305</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 102:14-103:2 (“Q Okay. And are there depths that are less than 40 feet in this survey of the Mantua Creek anchorage? A Yes. Q And generally, where are they in the anchorage? A Principally, up in this northern part, there a -- that’s the 40-foot contour and everything within that is shallower than 40 feet. Q All right, can we back back out of this? A There are a couple other spots up here, one there and one there, they’re just one -- I think they might be just one reading or two readings that are less than 40 feet. Q And how close -- is this area anywhere near the CITGO terminal? A No.”)

<sup>306</sup> (Wilson Dep. dated October 12, 2005, at 22:16-23:11 (“Q Here it is. Going down a few more lines, we see under where it says, “Cargo: Minimum 325,000 BBLs/maximum full cargo for vessel of Bachaquero-13

crude oil. Quantity vessel loads to always be consistent with a 37-foot or less fresh water" -- actually, it just says "FW sailing draft at loadport." Did you have an understanding as to why CITGO was instructing that the vessel should be loaded consistent with a 37-foot or less fresh water sailing draft at the loadport of Puerto Miranda? A Thirty-seven feet was the published draft by the captain of the port for Puerto Miranda that the vessel could sail with, so we give that information as part of our -- that the ship should not exceed the published draft, but the or less is because the captain or the vessel owner has the right to decide what is the safe draft coming out of the port. So it can be less than that, but we definitely don't want them to exceed the 37 feet, which is the published draft.")

<sup>307</sup> Wilson Dep. dated November 28, 2007, at 27:25-29:8 ("Q. Ms. Wilson, are these voyage instructions for a different charter or a different voyage? A. Yes, they are. Q. So the record is clear, this is in the form of an e-mail from you dated July 16, 2004, to Charles Weber and Company regarding the GENMAR STRENGTH. Correct?

A. That's correct. Q. If you look down at the middle of the page on page 1, "Quantity of vessel loads to always be consistent with a 39-foot or less freshwater arrival draft at disport." You see that? A. That's correct. Q. Is that correct? The one that we had looked at for the ATHOS, Tsakos 19, gave a maximum freshwater sailing draft at load port and this one gives a maximum freshwater sailing draft at disport. Explain the reason for that to me. A. The ATHOS I was loading in Lake Maracaibo, and its draft is much shallower than the disport, so that is the controlling draft that I would give the ship. The other vessel loaded at Jose', or Puerto La Cruz, which is a port in the ocean with unlimited draft, so the controlling draft was definitely going to be the disport. Q. So you give whatever is the lesser of the two controlling drafts? A. That's correct")

<sup>308</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 128:7-131:17 ("Q Okay. Now, the orientation of the anchor that you've just described, did any of your inspections of the anchor, either in Philadelphia or subsequently in Baltimore, which I think you also did an inspection there, support your opinion that the anchor was perhaps standing up when it came into contact with the ship -- when the ship came into contact with it? A Yes. When we carried out a further inspection, I think it was in February, 2009, at Baltimore -- Q Is that the U.S. Coast Guard facility in Baltimore? A That's correct, the anchor and the damaged section were moved there; I'm not sure exactly what date, but they had been moved there by the time we carried out that inspection. And we wanted to see how the anchor would look with the flukes up, because it -- Q What did you discover? You wanted to see how it would look with the flukes standing up; what did you discover? A We discovered that -- we used a forklift truck to lift the flukes and discovered that after an angle of approximately 30 degrees the flukes rotated up to an angle of about 65 degrees to the horizontal and remained -- the anchor remained stable in that flukes-up position. Q Okay, hold on just a second. MR. LEVY: Can we see the video of that, please? And everybody get ready for the noise. THE VIDEOGRAPHER: No, the volume is down. MR. LEVY: Oh, you've got the volume down this time? Thank you. (Pause.) BY MR. LEVY: Q Is this a video of the anchor in Baltimore? A Yes, I believe it is, yes. Q And is that the container that you had the hull section brought up in? A I'm not sure if it's the same container, but it was a container that was in there, yes. THE COURT: Can anything be done to improve that visibility? MR. LEVY: Is there any way we can play this on the television, would that cause you a technical nightmare? (Discussion held off the record.) MR. LEVY: Just a second, your Honor. We'll play it on the television screen and it will be much clearer. THE COURT: I doubt it. MR. LEVY: You are a skeptic. (Laughter.) THE COURT: No, a cynic. MR. LEVY: A cynic. (Pause.) BY MR. LEVY: Q So, this thing that's back here, is that the pump casing? A That is the pump casing there, yes. Q All right. We're seeing the anchor being lifted by the forklift? A That's correct, yes. You'll see it's needing less and less support. (Pause.) A And it remains stable in that vertical or near-vertical position. MR. LEVY: I'm sorry, go back to the end of that, please, and just freeze it in the up position. I'll tell you when to stop. (Pause.) BY MR. LEVY: Q Did it surprise you when you saw this anchor pop up like this? A Yes, it did. Q Why? A Well, I wasn't expecting it to have its own momentum at that point, I was expecting the forklift truck to support it to a much higher angle, and it indicated that the anchor must have -- in its present state at least, must have had a very low center of gravity. Q And did you or did somebody from your office later do an analysis of the center of gravity of this anchor? A That's correct, yes. Q And what did you find? A I found it did have a very low center of gravity. I can only point to the area, that it's in this kind of area, but we did do a detailed analysis of where the center of gravity would be and it confirmed -- again, I asked my colleague, Dr. Anaracliff to do this -- that it would lift and, theoretically, you could estimate that it would lift at an angle of about 30 degrees; if it was put to an angle of about 30 degrees to the horizontal, it would continue lifting under its own momentum.")

<sup>309</sup> Trial Tr. Day 9, October 5, 2010, Crosson, at 129:5-130:7 ("THE COURT: Thank you. I'm curious. I assume that this anchor, which was found up on the bottom of the river, had previously belonged to a ship of some



kind? THE WITNESS: Yes. THE COURT: And presumably was attached to that ship by an anchor, but I haven't heard anything about any anchor chain for that anchor. Do you know anything about anybody discovered an anchor chain? THE WITNESS: No, there was no anchor chain, your Honor. In fact, the stock or the shank of the anchor, which is the rectangular portion that is attached to the anchor chain, had been flame cut at some prior date. The stock surface was a flame-cut surface and it had been severely corroded. So, it had been sitting there, in that condition, for a period of time. THE COURT: I was going to ask if you had made any metallurgical study of that end of the anchor, where the chain would have been attached? THE WITNESS: Yes, that was a flame-cut surface that had corroded. BY MR. WALKER: Q Can we show the Judge that? Is this what you're speaking of here, in the -- the thing that's lying down, is that -- A Right there, that's the stock or the shank of the anchor. That's a flame-cut surface, so, at some point in time, this anchor was cut away from its chain. Why it was cut through the shank rather than cutting it through the chain, I don't know and I don't think anybody knows.")

<sup>310</sup> Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:4-218:15 ("4 any forces at all can be generated on the way out. Q But in attempting to consider whether Dr. Langford's assessment was accurate, you studied both a fulcrum effect using the longitudinal bulkhead -- A Yes. Q -- which is one of the hard structures -- A Yes. Q -- and also without the hard structures. You used both scenarios. A That's right, yes. Q Okay. And counsel also talked to you about the geometry of the anchor. You studied the geometry of the anchor; is that correct? MS. HENNESSY: And can we show P-938, please? BY MS. HENNESSY: Q In the context of one of your reports, correct? A Yes. Q And when you studied the anchor, and it's geometry, did you also consider the center of gravity? A Yes. Q And did that assist you in finding -- in your findings with respect to the likely attitude that the anchor would have taken on the river bottom? MR. DeGIULIO: Objection, your Honor. This is yet another new opinion on redirect. THE COURT: I don't think it is, but let's go. THE WITNESS: The position of the center of gravity will have some bearing on the most stable position that the anchor -- the attitude that the anchor can take up. BY MS. HENNESSY: Q And did you find what that most stable position would be based on the center of gravity of the anchor? A Yes, I did some calculations showing that if the -- there are two positions of equilibrium. There's a fluke stand. It can be reasonable stable with the flukes completely down, it can be reasonably stable with the fluke up, and there is an angle at which the -- it tends to fall into the upright condition or fall into the down -- Q And what is that -- A -- condition. Q -- angle? A That angle from memory is about 32 degrees to the horizontal. Q So -- A If it's lifted or disturbed up from that -- from a horizontal position by whatever means, a chain or any -- any sort of disturbance, and any object hitting it, and sufficiently to move it away from its horizontal temporally, away from its horizontal position, then it's quite -- quite feasible for it to flip into the upright condition. Q And was that part of your assessment with respect to the likely attitude of the anchor and what it would have taken? A That's right, because the -- any such disturbance is more likely to result -- any large disturbance is more likely to cause it to come to -- to come to the upright -- take an upright attitude rather than a fluke stand attitude. THE COURT: I want to make sure I understand. You're saying that if the anchor was flat, lying flat on a level surface, and something lifted it just enough to create a 30-some degree angle from the horizontal, that it would be likely to continue to go upwards? THE WITNESS: That's exactly so, your Honor.")

<sup>311</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 50:17-51:3 ("Q In applying the 41 inch measurement you took of the height of the anchor, based on the 2001 data and applying that to your depths, what is the range of depth of water above the anchor, with those shallower depths? A So, that half-foot shallower would bring the anchor to the tip of the tripping palm to 37.5 plus or minus .3. Q And the range would be what? A So, that would be 37.2 to 37.8. THE COURT: What depth of -- what tide did you assume? THE WITNESS: So, this is all based on mean lower low water.")

<sup>312</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 52:13-19 ("Q Is the information contained in the Summerfield and Madson digital data set adequate to detect the anchor at this location? A Yes. Q Is the information in the Summerfield and Madson data set adequate to recognize the target as an anomaly? A Yes.")

<sup>313</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 60:19-62:4 ("Q Can you tell us what this is? A Yes, these are the areas that if -- if we did a -- we were asked to do a general obstruction survey, that we would deploy side scan sonar into look for obstructions. THE COURT: Right. BY MR. BERGERE: -- am I correct in seeing that that's into the federal channel? A We typically go into a channel that's -- that's surveyed by someone else. And actually, if you recall, we would do straight lines, and as we finish our lane, we would turn around and come back, so our sonar data would have bumps like this. And I'm old school, I collect everything. All the data that comes into my computer system, I collect it. Some people would turn the system off on turns, because it's not part of the contract. I leave it on. And I would look at that data into the channel, and if I saw nothing, then I would probably just delete the

data. But if I saw a target in here, I would notify the client that there was a target, even though it's just out of our -- our survey area. Q And this is a survey that you would have -- that you estimate would be an eight to 10,000 survey in 2004 dollars? A Yes. Q And would that survey that you would have covered picked up the concrete block, the anchor, and the pump casing? MR. DeGIULIO: Object. Object to the form, your Honor. MR. BERGERE: What -- MR. DeGIULIO: It's leading. THE COURT: Stop leading the witness. Q And I notice that you have -- the top of the survey would BY MR. BERGERE: Q Would the objects that were detected in this case have been picked up in a survey of this kind? A I believe so.")

<sup>314</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 56:10-25 ("Q Now, an object the size of this anchor is easy to detect on side scan sonar image? A Yes. Q And side scan sonar images would typically, you would expect, could locate an object or at least, locate, I think, Mr. Fish's word was an anomaly or detection to be able to detect something, correct? A Yes, that's correct. Q And your rotary side scan sonar, if it had been set up out in this anchorage, would have been capable of picking up an object like this? A Yes, it would have been. Q And how about the yellow remote vehicle, with the sonar on it. If that had been deployed in this anchorage, would that have been able to identify this anchorage? A Yes.")

<sup>315</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 143:23-145:17 ("Q How effective would side scan sonar have been for locating an object such as the anchor that is depicted in the photographs around this room here behind counsel table, over there, it's the same anchor? MR. CALDER: Objection, your Honor, that is pure speculation, because he doesn't know exactly what it is. THE COURT: It is, and therefore not very convincing, but you may answer it. THE WITNESS: Well, a target like that would be easy to see as long as it wasn't buried. BY MR. LEVY: Q And why do you say that? A Because side scan does not penetrate the sediment, so if the target is buried, we cannot see it with side scan sonar. Q Was side scan sonar technology commercially available on the Delaware River in 2004? A Yes, it was. Q How do you know that? A Because I was doing side scan surveys for various customers on the river all through the '90s, and as I stated, the first one was in 1986.")

<sup>316</sup> Long Dep. dated August 29, 2007, at 86:4-12 ("Q.If objects like a large cement pipe or a naval anchor or a large cement box were sitting on the riverbed, is that the type of objects that sonar side scan is capable of finding? MR. LeBLANC: Object to the form of the question. THE WITNESS: That is the type of equipment that could find that kind of materials.)

<sup>317</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 29:9-30:4 ("Q And have you published books in this field? A I have. Q And is this one of your publications? A That's the first one. Q This is the first one called Sound Underwater Images? A That's correct. Q And that was produced with a gentleman named Arnold Carr? A Yes. Q Who is Arnold Carr? A He's my partner in the company and co-author for both of my books. Q Is this your second book, Sound Reflections? A It is. Q And are these treatises -- THE COURT: Do you refer to them as your books rather than his? THE WITNESS: We don't argue about it, your Honor. BY MR. BERGERE: Q And are these treatises recognized in the field as leading treatises in the area of underwater surveying? THE COURT: Absolutely. Go ahead.")

<sup>318</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 21:9-22:18 ("Q And are there three steps to identifying objects that you observe, or that are detected by side scan sonar equipment? A In my industry, in sonar technology, there are three distinct steps to identifying a target on the seabed. The first is detection. Did the system electronically detect the target? And in this case, that target would not be detected. The system can't detect it because of its settings. In this case, the target would be detected, and in order to -- if I may, sonar displays are a lot like a television screen. One line is little black and white pixels and it doesn't mean anything to the human brain or eye. Five lines or six lines put together, juxtaposed, begin to make an image that the eye-brain interface can recognize an anomaly. Something is there in the data. Q Is that what's called recognition? A Recognition. So if the system detects it, and detects it enough times as this picture is being built, now the operator, a trained operator will recognize an anomaly or something different from the environment, something that's different than the overall surrounding environment. Q Is recognition the same as identification? A No, recognition is the second step in a three-stage process. Identification is rarely done in side scan sonar positively. I can give an example where it would be. If there were intact large aircraft, and the two rates were slow, and the ping rates were high, and you could see the propellers, an operator would say that is very probably an aircraft. We're reluctant to say anything is absolutely something. But for small objects the size of a refrigerator, or a burned car frame that was dumped in the water, you really have to put eyes on that target. You either have to video it with an underwater video system, or you have to have a diver go down and describe it. So identification is the last step.")

<sup>319</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 21:9-22:18 (“Q And are there three steps to identifying objects that you observe, or that are detected by side scan sonar equipment? A In my industry, in sonar technology, there are three distinct steps to identifying a target on the seabed. The first is detection. Did the system electronically detect the target? And in this case, that target would not be detected. The system can't detect it because of its settings. In this case, the target would be detected, and in order to -- if I may, sonar displays are a lot like a television screen. One line is little black and white pixels and it doesn't mean anything to the human brain or eye. Five lines or six lines put together, juxtaposed, begin to make an image that the eye-brain interface can recognize an anomaly. Something is there in the data. Q Is that what's called recognition? A Recognition. So if the system detects it, and detects it enough times as this picture is being built, now the operator, a trained operator will recognize an anomaly or something different from the environment, something that's different than the overall surrounding environment. Q Is recognition the same as identification? A No, recognition is the second step in a three-stage process. Identification is rarely done in side scan sonar positively. I can give an example where it would be. If there were intact large aircraft, and the two rates were slow, and the ping rates were high, and you could see the propellers, an operator would say that is very probably an aircraft. We're reluctant to say anything is absolutely something. But for small objects the size of a refrigerator, or a burned car frame that was dumped in the water, you really have to put eyes on that target. You either have to video it with an underwater video system, or you have to have a diver go down and describe it. So identification is the last step.”)

<sup>320</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 52:12-53:13 (“BY MR. BERGERE: Q Is the information contained in the Summerfield and Madson digital data set adequate to detect the anchor at this location? A Yes. Q Is the information in the Summerfield and Madson data set adequate to recognize the target as an anomaly? A Yes. Q And is the information in the Summerfield and Madson data set adequate to actually identify the target? A No. Q Okay. Is the information in the Summerfield and Madson data set adequate to determine whether the anchor is resting in a flukes up or flukes down position? A No. Q Does the digital data from the Summerfield and Madson survey allow an expert in this field to conclude, with a reasonable degree of certainty, whether the anchor is flukes up or flukes down? A No. Q And why is that? A Actually, the way the -- this particular survey was done, the ping rate is fairly low, and the two speed is fairly high, and those settings are used for general riverbed or seabed classification bed form identification, and perfectly adequately for that. For target identification, those are not the settings that I would use for a sonar.”)

<sup>321</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 54:21-25 (“Q Okay. And can the height or dimensions of the anchor be determined from the Summerfield and Madson data information by enlarging it in this fashion? A No, the resolution drops off. I wouldn't attempt to measure altitude or height from this data.”)

<sup>322</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 33:8-34:5 (“Q So the interpretation is actually comes from reading the shadow? A And the hard reflection. We take all of it into account. That's important. Q Now, what is this image? A This is also the pump casing. Did we show a pump casing? Yes, we did. Q Yes. A This is also the same target, but from a different angle, so the shadow looks different, and the target looks a little different. This is why the more passes I have on a target, the better idea I have of whether it's a target, or still a target of interest. MR. BERGERE: Can we have 1139-A? THE WITNESS: So these are the two images we just saw. This one looks different than this one, but it's the same object. I just looked at it. I aimed the sonar at it or towed it by the target at different angles to give me a different aspect ratio. And here I can see some protrusions which I don't really clearly see here, but I see ribbing over here, so I'm -- I'm adding to my interpretation an opinion of how important this target might be.”)

<sup>323</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 51:21-52:1 (“Q Okay. Now, do you believe a reasonable side scan sonar expert would be able to make determinations with respect to the profile of that anchor on the riverbed from the Summerfield and Madson data? A I don't, because the ping rate is fairly low, and the speed of the vessel is higher than you would normally use.”)

<sup>324</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 53:2-54:5 (“Q Does the digital data from the Summerfield and Madson survey allow an expert in this field to conclude, with a reasonable degree of certainty, whether the anchor is flukes up or flukes down? A No. Q And why is that? A Actually, the way the -- this particular survey was done, the ping rate is fairly low, and the two speed is fairly high, and those settings are used for general riverbed or seabed classification bed form identification, and perfectly adequately for that. For target identification, those are not the settings that I would use for a sonar. Q Okay. And is there some portion of the anchor that might remain uninsonified as a result of those settings chosen by Summerfield and Madson? A I calculated the -- the ping rate

and the two speed from the data, and it looks as though there is a ping about every 13 or 14 feet of forward motion, so there would be an area of uninsonified seabed and target in between those pings. Q And so portions of the anchor might actually be missed; that is, referring back to one of your earlier exhibits -- MR. BERGERE: Can we look at -- well, we don't need to look back at one of your exhibits -- BY MR. BERGERE: Q -- but you explained the uninsonified area. How is it that the Summerfield and Madson data might have led to an uninsonified area? A Well, the tow speed was high and the ping rate was low, so the two fish moved forward between pings.")

<sup>325</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 54:6-25 ("Q And is there -- can you overcome that by the effect of beam spreading; in other words, the beam can spread and perhaps insonify areas that might be in between the pings? A Well, this target is reasonably close to the transducers, which -- which wouldn't allow for a lot of beam spreading, but once beam spreading takes over, your resolution begins to drop. If you recall, out away from the tow fish, those two targets would show up as one, which in reality they're two. So the resolution begins to drop off as you move away from the tow fish. Q So if this object were close to the two fish, it might remain uninsonified, and if it was further out and picked up in beam spreading while insonified, it's resolution would go down? A That's correct. Q Okay. And can the height or dimensions of the anchor be determined from the Summerfield and Madson data information by enlarging it in this fashion? A No, the resolution drops off. I wouldn't attempt to measure altitude or height from this data.")

<sup>326</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 60:8-61:3 ("Q And so, it's possible that if a portion of the anchor was sitting up and 13 inches was not displayed, that it might not be insonified on a single pass, like this one, by Somerfield and Madsen? A No, I do not agree with that. Since the deposition, I did a detailed analysis of what's called beam spreading, similar to the analogy of the flashlight that we have been using. Side scan sonar pings are not infinitely narrow laser beams, but have some spread as they travel away from the sonar transducer. And at the range that the anchor was located, the spread would have been about eight inches. So, there would have been -- and even that, so the spread is defined by the 50 percent power level. So, 50 percent of the power of the sonar, so you could think of the brighter part of the flashlight is within that eight inches, but then the remaining 50 percent of the power is outside of that eight inches. So, if you do 13 minus 8, there is actually only 5 inches that receives less than 50 percent of the power. So, I believe that if the flukes were pointed upward, there would have been clear evidence of them in that side scan sonar imagery.")

<sup>327</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 52:23-54:25 ("Q Okay. Is the information in the Summerfield and Madson data set adequate to determine whether the anchor is resting in a flukes up or flukes down position? A No. Q Does the digital data from the Summerfield and Madson survey allow an expert in this field to conclude, with a reasonable degree of certainty, whether the anchor is flukes up or flukes down? A No. Q And why is that? A Actually, the way the -- this particular survey was done, the ping rate is fairly low, and the two speed is fairly high, and those settings are used for general riverbed or seabed classification bed form identification, and perfectly adequately for that. For target identification, those are not the settings that I would use for a sonar.") Q Okay. And is there some portion of the anchor that might remain uninsonified as a result of those settings chosen by Summerfield and Madson? A I calculated the -- the ping rate and the two speed from the data, and it looks as though there is a ping about every 13 or 14 feet of forward motion, so there would be an area of uninsonified seabed and target in between those pings. Q And so portions of the anchor might actually be missed; that is, referring back to one of your earlier exhibits -- MR. BERGERE: Can we look at -- well, we don't need to look back at one of your exhibits -- Q -- but you explained the uninsonified area. How is it that the Summerfield and Madson data might have led to an uninsonified area? A Well, the tow speed was high and the ping rate was low, so the two fish moved forward between pings.") BY MR. BERGERE: ("Q And is there -- can you overcome that by the effect of beam spreading; in other words, the beam can spread and perhaps insonify areas that might be in between the pings? A Well, this target is reasonably close to the transducers, which -- which wouldn't allow for a lot of beam spreading, but once beam spreading takes over, your resolution begins to drop. If you recall, out away from the tow fish, those two targets would show up as one, which in reality they're two. So the resolution begins to drop off as you move away from the tow fish. Q So if this object were close to the two fish, it might remain uninsonified, and if it was further out and picked up in beam spreading while insonified, it's resolution would go down? A That's correct. Q Okay. And can the height or dimensions of the anchor be determined from the Summerfield and Madson data information by enlarging it in this fashion? A No, the resolution drops off. I wouldn't attempt to measure altitude or height from this data.") Q -- but you explained the uninsonified area. How is it that the Summerfield and Madson data might have led to an uninsonified area? A Well, the tow speed was high and the ping rate was low, so the two fish moved forward between pings.")



<sup>328</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 129:6-16 (“Q It's the standard practice of the Army Corp that if an object is on the bottom of the river, within the federal project, but the top of that object does not extend above 40 feet, the Army Corp will simply leave that object there, correct? A With consultation with the Coast Guard. Sometimes, they're a little more conservative and nervous about it even being close to the project depth. So, they might still ask to remove it. Let's say it was at 41 feet, because something could happen maybe to move it and it could become a hazard, but generally, what you said is true.”)

<sup>329</sup> Trial Tr. Day 6, September 29, 2010, Fish, Day 6, at 71:4-13 (“Q And it was your conclusion, Mr. Fish, when you looked at the 2001 data, that the anchor target was within 10 to 15 feet of the position where you saw the anchor in the post- incident data, correct? A Yes. THE COURT: Did that make you believe that in the incident the anchor was moved by 10 or 15 feet or what? THE WITNESS: Your Honor, given -- given the resolution and positioning systems, I'm not sure I would say that, but it could have been.”)

<sup>330</sup> Trial Tr. Day 22, November 4, 2010 Traykovski, at 24:6-18 (“Q Now, when you reviewed and analyzed the 2001 side scan imagery, did you determine the anchor's location in relation to the 2005 recovery location post-incident? A Yes, it was within zero to ten feet of the location in 2005. Q And when you reviewed the 2001 side scan sonar imagery -- THE COURT: Excuse me, before we leave that. He said something about zero, what -- Q Okay, can you tell us what was your conclusion when you compared the location of the anchor in the 2001 data, to the location of the anchor in the 2005 data? A My conclusion was that it had move less than ten feet, what I had said is, between zero and ten feet.”)

<sup>331</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 52:1-15 (“Q Okay. And you noted that there was, from your review of the data, activity where anchors had been dropped and chains had been dragged in this area, in proximity to the anchor? A Yes, not in the immediate proximity. Q Well, from the 2001 side scan data you showed, it showed some, what you called anchor drag -- anchor chain marks or things that you interpreted as anchor drag? A Yes, I'd have to look at the data to determine approximately how far apart they were. Q But it's conceivable that objects like anchor chains or anchors being dropped in that area, could come in contact with an object like the anchor in this case, if it was sitting on the bottom of the anchorage for three or four years? A It is conceivable.”)

<sup>332</sup> Trial Tr. Day 22, November 4, 2010 Traykovski at 52:10-15 (“Q But it's conceivable that objects like anchor chains or anchors being dropped in that area, could come in contact with an object like the anchor in this case, if it was sitting on the bottom of the anchorage for three or four years? A It is conceivable.”)

<sup>333</sup> Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:5-218:15 (“Q But in attempting to consider whether Dr. Langford's assessment was accurate, you studied both a fulcrum effect using the longitudinal bulkhead -- A Yes. Q -- which is one of the hard structures -- A Yes. Q -- and also without the hard structures. You used both scenarios. A That's right, yes. Q Okay. And counsel also talked to you about the geometry of the anchor. You studied the geometry of the anchor; is that correct? MS. HENNESSY: And can we show P-938, please? BY MS. HENNESSY: Q In the context of one of your reports, correct? A Yes. Q And when you studied the anchor, and it's geometry, did you also consider the center of gravity? A Yes. Q And did that assist you in finding -- in your findings with respect to the likely attitude that the anchor would have taken on the river bottom? MR. DeGIULIO: Objection, your Honor. This is yet another new opinion on redirect. THE COURT: I don't think it is, but let's go. THE WITNESS: The position of the center of gravity will have some bearing on the most stable position that the anchor -- the attitude that the anchor can take up. BY MS. HENNESSY: Q And did you find what that most stable position would be based on the center of gravity of the anchor? A Yes, I did some calculations showing that if the -- there are two positions of equilibrium. There's a fluke stand. It can be reasonable stable with the flukes completely down, it can be reasonably stable with the fluke up, and there is an angle at which the -- it tends to fall into the upright condition or fall into the down -- Q And what is that -- A -- condition. Q -- angle? A That angle from memory is about 32 degrees to the horizontal. Q So -- A If it's lifted or disturbed up from that -- from a horizontal position by whatever means, a chain or any -- any sort of disturbance, and any object hitting it, and sufficiently to move it away from its horizontal temporally, away from its horizontal position, then it's quite -- quite feasible for it to flip into the upright condition. Q And was that part of your assessment with respect to the likely attitude of the anchor and what it would have taken? A That's right, because the -- any such disturbance is more likely to result -- any large disturbance is more likely to cause it to come to -- to come to the upright -- take an upright attitude rather than a fluke stand attitude. THE COURT: I want to make sure I understand. You're saying that if the anchor was

flat, lying flat on a level surface, and something lifted it just enough to create a 30-some degree angle from the horizontal, that it would be likely to continue to go upwards? THE WITNESS: That's exactly so, your Honor.")

<sup>334</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 115:1-5 ("Q Each time the prior ship knocked the anchor down, it's your opinion that it popped back up, right, to a 65 degree angle? A For it to have been in the position it was in when the ATHOS I passed over it, yes.")

<sup>335</sup> Trial Tr. Day 32, November 30, 2010, Ractliffe, at 216:5-218:15 ("Q But in attempting to consider whether Dr. Langford's assessment was accurate, you studied both a fulcrum effect using the longitudinal bulkhead -- A Yes. Q -- which is one of the hard structures -- A Yes. Q -- and also without the hard structures. You used both scenarios. A That's right, yes. Q Okay. And counsel also talked to you about the geometry of the anchor. You studied the geometry of the anchor; is that correct? MS. HENNESSY: And can we show P-938, please? BY MS. HENNESSY: Q In the context of one of your reports, correct? A Yes. Q And when you studied the anchor, and it's geometry, did you also consider the center of gravity? A Yes. Q And did that assist you in finding -- in your findings with respect to the likely attitude that the anchor would have taken on the river bottom? MR. DeGIULIO: Objection, your Honor. This is yet another new opinion on redirect. THE COURT: I don't think it is, but let's go. THE WITNESS: The position of the center of gravity will have some bearing on the most stable position that the anchor -- the attitude that the anchor can take up. BY MS. HENNESSY: Q And did you find what that most stable position would be based on the center of gravity of the anchor? A Yes, I did some calculations showing that if the -- there are two positions of equilibrium. There's a fluke stand. It can be reasonably stable with the flukes completely down, it can be reasonably stable with the fluke up, and there is an angle at which the -- it tends to fall into the upright condition or fall into the down -- Q And what is that -- A -- condition. Q -- angle? A That angle from memory is about 32 degrees to the horizontal. Q So -- A If it's lifted or disturbed up from that -- from a horizontal position by whatever means, a chain or any -- any sort of disturbance, and any object hitting it, and sufficiently to move it away from its horizontal temporally, away from its horizontal position, then it's quite -- quite feasible for it to flip into the upright condition. Q And was that part of your assessment with respect to the likely attitude of the anchor and what it would have taken? A That's right, because the -- any such disturbance is more likely to result -- any large disturbance is more likely to cause it to come to -- to come to the upright -- take an upright attitude rather than a fluke stand attitude. THE COURT: I want to make sure I understand. You're saying that if the anchor was flat, lying flat on a level surface, and something lifted it just enough to create a 30-some degree angle from the horizontal, that it would be likely to continue to go upwards? THE WITNESS: That's exactly so, your Honor.")

<sup>336</sup> Trial Tr. Day 8, October 4, 2010, Aviram, at 118:22-119:11 ("THE COURT: Excuse me. But in your analyses did you consider whether the vessel pushed any part of the anchor into the bed of the stream? THE WITNESS: Yes, I have. THE COURT: And what conclusions did you reach as to that? THE WITNESS: I concluded that indeed this has taken place. And I used the so-called reverse engineering method, namely I knew that the river bed had sufficient resistance in order to drive the anchor into the hull. By observation of the degree of the penetration into the hull I had an assessment of both load and deflection or the degree to which it penetrates the river bed. So from these two variables by means of successive development I could associate a value of resistance of the river bed.")

<sup>337</sup> Trial Tr. Day 8, October 4, 2010, Aviram, at 132:2-20 ("Q And did you observe what occurred if you had made the river bed much softer? A There was no point in doing that. Well, the -- Q What would occur in your program if you made the river bed softer? MR. WHELAN: Objection, speculation, your Honor. THE COURT: Objection overruled. Everything else is, too. Go ahead. THE WITNESS: As I previously explained to the Judge, the river bed material was the hardness or stiffness of it was a direct function of the actual damage. So from my point of view what it was actually made of was of no significance because the yardstick that I used is the actual damage. This told me what this medium called the river bed had to exert on the hull. And I found that it is somewhere in the region of, if I remember correctly, 500 kilometers per square meter of resistance that this anchor, this the river bed had to exert in order to get into this, to generate this damage.")

<sup>338</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 51:20-24 ("Q And, in fact, even today you have no physical evidence on which to base an opinion regarding the extent to which the anchor was buried prior to contact, do you? A I don't, other than I understand it's hard, the riverbed is quite hard. That's the extent of my knowledge.")

<sup>339</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 136:18-137:8 ("Q How is it possible that a 9 ton anchor remained in a stationary position when it was contacted by a 64,000 ton object? A Right. THE COURT: Just lucky, I guess. THE WITNESS: If that anchor was lying such that the palms were in firm contact with the riverbed, and the



riverbed was hard, right? The first point is that fluke has-- has a very strong strut, very strong indeed, never mind the ship moving on to it. You've got the curve of the bilge plating. So as the curve of the bilge plating comes around onto the flatter bottom, the anchor is going to make gradual contact. And if the angle of the contact is such that it's pushing directly onto the fluke, and so it's transmitting a force down through the fluke into the riverbed, then it's entirely possible that that's what happened.")

<sup>340</sup> Trial Tr. Day 11, October 7, 2010, Bowman, Day 11, at 111:7-112:16 ("Q Now, were able to reach all of these conclusions and opinions when you were in Mobile, Alabama in 2005? A No, I was not. Q At that point, had you even seen the anchor? A No, we had not. We left and an object, which may well have been anchor, was found on the bottom of the Delaware River in the vicinity of the anchorage, but we didn't know how it might relate to this damage and whether it was a possible candidate to cause this damage. Q Okay. MR. LEVY: Can we look at -- and you can just stand right there, Mr. Bowman -- can we look at Video Clip Number 2, the video clip of the round hole? Okay, now we're looking at it on the screen over here to the right. THE WITNESS: Yes, this is the round hole and the top of the screen, if you like, is outboard of that round hole. And in my -- MR. LEVY: We have to go back and do it again, please? And I'll tell you when to stop. Okay, stop there for a second, please? BY MR. LEVY: Q Talk -- tell us about the relationship between the round hole and the long hole as we're seeing them here under the bottom of the hull in Mobile, Alabama in January of 2005. A Right. Well, again, we were looking at two isolated damages. There did not appear to be any connection between this round hole and the long hole. Q And why was that significant? A Well, as I was saying earlier, you normally would expect some scraping or deep scoring damage occurring connecting damages. So, it's all rolled into one. Even if it's one object, it's a continuation, continuing damage. But here they were separate and appear to be isolated. So, it was a puzzle as to how one object had caused these two isolated damages.")

<sup>341</sup> Trial Tr. Day 6, September 29, 2010., Fish, at 30:16-31:22 ("MR. BERGERE: Can we have 1138?

BY MR. BERGERE: Q Mr. Fish, can you describe what this is? A This was one of the anomalies that we located during the quick, early survey of the Mantua Anchorage. I hope I'm using the correct terminology for where we were. To me it was a very interesting feature. It's different than the surrounding seabed. That arrow was just to point out what we call an acoustic shadow, the white area. This white area is the track of the ship and the track of the sonar. Q When you say "the ship," you're talking about the vessel, the ship that is pulling the sonar -- A Sonar, I'm sorry. Q -- fish at this point? A The survey vessel. When I talk about the vessel, it will be typically be the survey vessel. Q And the white track is actually directly below the two fish? A That's correct, and because it takes some time for the sound to get to the bottom before the first reflection comes back, unless there are animals in the water column above the bottom, that was usually white. This was clearly a man-made target to me, because it has a curving feature, it has -- it's got some density, and if you look closely, you can see small ribs here. Now, we didn't know what that was, but we knew that it was a significant anomaly. Oh, thank you. Here's the ribs that you can see if you blow it up. I call them ribs because I know now they were, but they're distinctive features for a target underwater.")

<sup>342</sup> Trial Tr. Day 6, September 29, 2010., Fish, at 36:6-37:25 ("Q Can you describe what we're looking at in 1163? A Yes, this is a sonar pass. The same kind of sonar data. Here we have the path of the vessel, the path of the two fish, and, again, it's white because it takes some time for the acoustic beam to reach the bottom, and it registers no reflections during that time. And this is the -- the bottom of the riverbed, and out to the right of the sonar tow, and this is the bottom of the riverbed, and out to the left. And it's called a side scan because it takes time for that sonar beam to propagate out and bounce back, and if there are things sticking out, or protruding, standing off the substrate or the sediment, we can see that with higher reflections and some shadows behind them, and also there are areas of softer sediment. In this case, I believe this might be oil, but it looks like a muddy -- a muddy substrate. That's probably a muddy substrate. This target here -- we found two other targets in the anchorage area during our first survey, and we didn't know what they were, but this is clearly a hard target with a shadow. It has some altitude. And this one is also a hard target with some altitude to it. Q And these are -- you call these sonograms? A Sonograms. Q Sonograms. And these are sonograms that are printed from your data, the data from your surveys? A That's correct. Q And that's true with all the sonograms we've looked at so far? A That's correct. Q Okay. And -- THE COURT: What about the line up above that doesn't have a circle around it? THE WITNESS: This one? BY MR. BERGERE: Q Yes. A That, I believe, and we had it checked by divers, is a mound of sediment that was -- we don't know what created it, but it's a sediment that's been pushed, as if something large had settled in the bottom and

moved sideways, so it built up a little mound of sediment. *Q* Now, the object circled in the lower right, what did you determine that to be? *A* Well, we did the positioning, and put the divers on it, and it was determined to be an anchor.”)

<sup>343</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 47:15-21 (“*Q* So at the completion of the first set of surveys you performed with the Kline 3000 system that you described at the end of November of 2004, were you able to -- was the equipment able to both detect, and you were able to recognize the anchor, the pump casing, the concrete block, and the scour line? *A* That's correct.”)

<sup>344</sup> Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25 (“*Q* The search that the Army Corps conducted at Mantua Creek Anchorage, after the ATHOS incident, was done using multi- beam sonar, correct? *A* Yes. *Q* And the NOAA survey vessel was using side scan sonar, right? *A* Yes. *Q* And as a result of these searches, there were several objects found lying on the bottom of Mantua Creek Anchorage, correct? *A* Yes.”)

<sup>345</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 21:9-22:18 (“*Q* And are there three steps to identifying objects that you observe, or that are detected by side scan sonar equipment? *A* In my industry, in sonar technology, there are three distinct steps to identifying a target on the seabed. The first is detection. Did the system electronically detect the target? And in this case, that target would not be detected. The system can't detect it because of its settings. In this case, the target would be detected, and in order to -- if I may, sonar displays are a lot like a television screen. One line is little black and white pixels and it doesn't mean anything to the human brain or eye. Five lines or six lines put together, juxtaposed, begin to make an image that the eye-brain interface can recognize an anomaly. Something is there in the data. *Q* Is that what's called recognition? *A* Recognition. So if the system detects it, and detects it enough times as this picture is being built, now the operator, a trained operator will recognize an anomaly or something different from the environment, something that's different than the overall surrounding environment. *Q* Is recognition the same as identification? *A* No, recognition is the second step in a three-stage process. Identification is rarely done in side scan sonar positively. I can give an example where it would be. If there were intact large aircraft, and the two rates were slow, and the ping rates were high, and you could see the propellers, an operator would say that is very probably an aircraft. We're reluctant to say anything is absolutely something. But for small objects the size of a refrigerator, or a burned car frame that was dumped in the water, you really have to put eyes on that target. You either have to video it with an underwater video system, or you have to have a diver go down and describe it. So identification is the last step”)

<sup>346</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, Day 22, at 56:10-17 (“*Q* Now, an object the size of this anchor is easy to detect on side scan sonar image? *A* Yes. *Q* And side scan sonar images would typically, you would expect, could locate an object or at least, locate, I think, Mr. Fish's word was an anomaly or detection to be able to detect something, correct? *A* Yes, that's correct.”)

<sup>347</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 105:19-106:19 (“*THE WITNESS*: We have better close-up pictures of it and, in my opinion, that's a score mark made by the fluke as it was sticking up from the riverbed and made -- began to make hard contact with the ship's plating at that point, maybe a bit before then as well. And as the ship continued over it, it pierced the hull. And here, behind this edge of the -- inboard edge of the long hull is the longitudinal bulkhead, which you can't see here but it would be vertical in the ship, and that offered a great deal of resistance and that deflected the fluke to follow the line of that bulkhead. So, it came in at this angle here, which Mr. Crosson measured that angle, I asked him to measure that angle when he attended an inspection in Baltimore, and this angle was found to be about 42 degrees. But as it went on -- *BY MR. LEVY*: *Q* 42 degrees to what? *A* 42 degrees to the longitudinal center line of the vessel. As the tip continued making harder contact and piercing the hull, in my opinion, it was deflected to change its angle to run along that longitudinal bulkhead. And as the resistance got greater, the fluke tip was turned back and was forced to follow the ship as the ship moved over it and, as it was forced back, as I was saying earlier, this part of the fluke that I'm pointing to here, these two ridges, forced this flap of plating up into the hull. And we see the score marks on another photograph, as we can see later.”)

<sup>348</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 109:22-111:6 (“*Q* What's the significance of the longitudinal bulkhead at that location with respect to the path of the fluke as the fluke is coming into the ship? *A* Well, as I was saying earlier, you can see the path of the fluke is continuing until it gets close to the longitudinal bulkhead. *Q* The light-blue line is the longitudinal bulkhead? *A* And the light-blue line is the line of the longitudinal bulkhead on the inside of the hull, and you can see how it's deflected and forced to follow that line by the resistance of the structure. The longitudinal bulkhead is on the order of 15 millimeters thick connected by a double philip (ph) weld to the side shell structure. *Q* What effect did that have on the tip of the fluke? *A* Well, that's another feature,

turning to the anchor. The tip was bent through about 90 degrees or more and I believe that happened when the tip again became close to this longitudinal bulkhead, because the force became so great it was enough to bend the tip through about 90 degrees. THE COURT: 90 degrees from what? THE WITNESS: From its original -- THE COURT: Well, that's -- MR. LEVY: We have the anchor up here. THE COURT: -- that's certainly not 90 degrees. THE WITNESS: And then that top of the fluke, your Honor, is bent up -- in back on itself, correct, I stand corrected, but it was the front was -- it was bent at least the 90 degrees to come back on itself. BY MR. LEVY: Q Okay. What are you showing there with respect -- sorry. A Well, then I'll just continue on. We've got these flaps here, that's what I'm saying -- said earlier, that is the flap which was pushed inward. This transfers bracket was pierced by the fluke as the fluke tip went into the hull and just before it was rotated aft.")

<sup>349</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 118:14-119:17 ("Q Okay. I'm sorry I interrupted you. What is the significance of the two lines here that are approximately nine inches apart? A This flap -- we are now looking in the other direction, unfortunately, to how it was orientated on that screen, we're now looking at it in the other direction. So, aft is to the left of this large screen and forward is to the right, but it's the same flap. There's a score mark there, I'm pointing to the top of the top of the screen, where that red arrow points to the area of where that score mark is on the ship's bottom plating. And on the bottom left-hand side of the screen you can see another score mark where the red arrow points into where it is on the ship's bottom plate. And the distance between those two score marks is approximately nine inches and that's the approximate width of the -- it's the approximate width of the anchor fluke. Q We have a large photograph, actually a life-size photograph of the anchor there, can you show us on that what you're referring to? A Yes, I can. It's that top edge, the distance, the vertical distance from that to the bottom edge. Q Okay. And what does this tell you about how the accident occurred? A Well, it supports the view that the fluke -- if you accept, which I do, that the fluke came in and pierced the hull at about an angle of about 65 degrees, then the ship then forced the fluke to rotate aft, then it would be logical for these two score marks to have been caused by the two ridges of the anchor that I pointed to earlier.")

<sup>350</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 124:6-125:16 ("Q Mr. Bowman, in your analysis of the cause of the accident, did you have an opinion as to why the ship wouldn't just slide over the anchor if it was standing up and just cause it to tip over? A Well, if the flukes were up but leaning outboard, away from the ship, then the likelihood is -- in my view, is the anchor would be pushed down and the ship would slide over it or the anchor fluke tips would slide across the bottom of the ship. If the fluke tips were leaning in towards the hull, then it seemed reasonable to me and logical that there is a real possibility that the tips or one of the tips of the flukes could become trapped following impact or contact with the ship's bottom plating, because the anchor fluke of course is quite a robust structure and it would put up initial resistance. And so the plating of the hull, although not fracturing, would begin to deflect around the tip of the fluke and -- Q Can you show us the area on -- from this picture where that anchor would have gotten caught and begun to deflect the -- or the plating would begin to deflect? A Well, I can't be that precise about that, but I believe it would be in this area -- Q Why -- A -- approximately in this area. Q Why that area? A Again, because this is -- the longitudinal bulkhead is behind here and the plating of the hull would deflect outboard of the bulkhead, but the bulkhead itself would put up strong resistance, so that the plating would begin to deflect adjacent to that bulkhead. Q Once the anchor tip becomes trapped in the plating, what effect does that then have on the rest of the plating and on the cause of the accident? A Well, the plating of the hull would go on resisting until the force caused the plating to fracture and then the fluke would pierce, obviously pierce the hull.:)

<sup>351</sup> Trial Tr. Day, 12, October 12, Bowman, at 136:18-141:9 ("Q How is it possible that a 9 ton anchor remained in a stationary position when it was contacted by a 64,000 ton object? A Right. THE COURT: Just lucky, I guess. THE WITNESS: If that anchor was lying such that the palms were in firm contact with the riverbed, and the riverbed was hard, right? The first point is that fluke has-- has a very strong strut, very strong indeed, never mind the ship moving on to it. You've got the curve of the bilge plating. So as the curve of the bilge plating comes around onto the flatter bottom, the anchor is going to make gradual contact. And if the angle of the contact is such that it's pushing directly onto the fluke, and so it's transmitting a force down through the fluke into the riverbed, then it's entirely possible that that's what happened. BY MR. DeGIULIO: Q The anchor wasn't embedded in cement, was it? A I didn't say that. Q I'm asking. THE COURT: Well, did you -- THE WITNESS: Not as far as I'm aware, sorry. BY MR. DeGIULIO: Q Now, well, what you just described to have occurred, doesn't a significant portion of the anchor have to be buried to hold it in position? A No, I don't believe it does. I mean, I'm not an expert on how this riverbed reacts. What you need is what I just described. You needed a firm, direct, in-line load on the strut, which was the fluke. MR. DeGIULIO: Can we go back to the closeup. Now, Exhibit 38, the third photo. Right. BY MR. DeGIULIO: Q Now, don't you agree that if, in fact, the tip made this mark, that there was sliding contact here? A Yes, the ship



moving over the tip. Q Right. And you've said that the anchor has to remain stationary. A Well, I have to put that in context now. I would -- it may not have been exactly stationary. What it had to do is put up the resistance to create that impression. That's what I'm saying. THE COURT: Would you agree that the relationship between the anchor and the bottom of the water had to be such that the anchor did not slide sideways when pushed by the ship? THE WITNESS: Yes, your Honor. THE COURT: And would that suggest to you that maybe some part of the anchor had been embedded in something? THE WITNESS: Yes, and I agree there must have been a line of resistance which would indicate there was at least a little covering of the anchor, embedment, yes, okay. BY MR. DeGIULIO: Q Do you remember telling me about all the other ships, your theory about all the other ships coming over and just pushing the anchor down? Do you remember that? A I said that's a probability, yes. Q Now, when you look at this mark, and tell me that the tip of this anchor made that mark, the anchor stayed stationary -- A Yeah. Q -- as the ship came -- A Yes. Q -- over it? A Yes. Q What force would hold that anchor up against the hull? In other words, why wouldn't this anchor do the same thing that you think it did with all the other ships which is to simply yield and fall down? A Well, first it's leaning into the hull, and, secondly, you've got the curve of the bilge giving you a gradual firmer and firmer contact as the ship moves over it. But if the anchor is already lying away from the direction of the motion of the ship, then I don't believe there was any way it could get caught. Q Well, you agree that when this mark was made, it wasn't caught on anything, was it? It wasn't caught on a weld, or a seam, or a hard spot. Why wouldn't the anchor simply fall down, Mr. Bowman? A Because it was -- it did -- it was caught making sliding contact. That's what's holding it there. There is a small probability, I absolutely agree with you, but that's the way it happened, and that's -- the anchor was offering resistance to the hull of the ship at that time, and the more the ship moved over the anchor, the firmer that entrapment became, because the plating would have been deflecting. As soon as any kind of force was put on the bottom plating, it wouldn't have failed at that time, but it would have begun to deflect. Q Okay. But at some point, and you agree this -- under your theory this started somewhere aft, right? A Right, I think you can see it. It looks to me anyway this is more of a shallower imprint towards the -- THE COURT: Right. THE WITNESS: -- right-hand side. BY MR. DeGIULIO: Q But at some point the moment, the instantaneous moment of contact between the fluke, under your theory, and that hull, I'm going to ask you one more time: Why wouldn't the anchor simply rotate down, as you said it would do with all those other ships? A Because with the other ships, for that -- for it to rotate down, it would be moving over -- if I can just use the anchor -- if it's moving across, the anchor's facing this direction, pointing away towards my right. When the ship moves across it, it pushes it down, or it stays in contact and just slides over it. The other way, the way I have it is you have the curve of the bilge -- I can't do it with my hand very well -- and the anchor tip becomes snagged in the plating. Q Well, the way you're holding it, you're not holding it at your 65 degree angle, are you? A That's 65 degrees, about 65, and along the longitudinal axis of the ship, so the plating moving to port and aft, as it gets deeper, the anchor is offering resistance and eventually pierces the hull, and then begins to move with the ship.")

<sup>352</sup> Trial Tr. Day, 12, October 12, Bowman, at 139:19-140:6 ("Q Well, you agree that when this mark was made, it wasn't caught on anything, was it? It wasn't caught on a weld, or a seam, or a hard spot. Why wouldn't the anchor simply fall down, Mr. Bowman? A Because it was -- it did -- it was caught making sliding contact. That's what's holding it there. There is a small probability, I absolutely agree with you, but that's the way it happened, and that's -- the anchor was offering resistance to the hull of the ship at that time, and the more the ship moved over the anchor, the firmer that entrapment became, because the plating would have been deflecting. As soon as any kind of force was put on the bottom plating, it wouldn't have failed at that time, but it would have begun to deflect.")

<sup>353</sup> Trial Tr. Day 32, October 30, 2010, Ractliffe, at 104:20-108:20 ("Q Did you also study the forces required to indent the hull? A I did, yes. Q And what did you find? A They're shown on the next page. MS. HENNESSY: If we could see the next page of this report? Thank you. THE WITNESS: What this shows, in summary, are the forces that are required to indent the plastic -- the shell plating on the bottom. Steel is actually a fairly ductile material. Once it reaches a certain level of stress, it begins to deform. And the first thing that happens before the -- the shell plating actually penetrates, and the hull breaks through, the first thing that happens is that the force applied to the bottom will cause a deflection in the bottom plating which, in effect, tracks the tip of the anchor in place. There's -- BY MS. HENNESSY: Q And when you say "deflection," do you mean indentation? A I mean an indentation, that's right. Q Of -- A The -- Q -- of the hull plating? A Of the hull plating, a circular, normally a fairly circular shape indenting upwards, dishing upwards. And, in effect, once that starts, that operation starts, the tip becomes effectively trapped because it's -- it's covered somewhat by the -- the surface of a dish shaped, concave surface, it becomes trapped. Q And what did you find were the forces required to deflect or deform the hull plating? A Well, the maximum force that you can develop in -- in plating like this is of the order of 30 tons, and this is what I showed for -- for this calculation. Q And is that where you show at the bottom 29. -- A That's right. Q -- 6 tons? A

29.6 tons. It could be a little higher than that, but the point of -- the point of this calculation is that that is sufficient force, before the plating has become punctured, that is sufficient force to bend the tip of the anchor. Q And the force required to bend the tip of the anchor

being -- A That was about 20 to 30 tons. Q And, so, how did you then compare the two forces with respect to the force that would be required to bend the fluke tip? A Well, what happens is that the tip makes contact with the bottom, the bottom begins to deflect and apply a resisted force to the tip of the anchor, but the resisted force from the plating on the ship is sufficiently large to cause the bending, a gradual bending of the tip of the anchor, and that process will then continue until the anchor -- the tip of the anchor has folded over 90 degrees or so, so that it now becomes flat with the surface of the bottom of the ship. But the ship is still bearing down on the anchor, because it's forcing the anchor over and up into the ship, and the bottom plating can no longer -- the tip no longer continues to bend. It's finished its bending process. But the anchor is now being forced up into the bottom of the ship, the ship can -- the plating can no longer resist this movement, and it will puncture through the bottom plating. So the bending of the tip occurs before there is any puncture of the bottom. It's the first thing to happen. Q And how did you determine that the bending of the fluke tip would occur in the manner in which it occurred in this instance with the fluke tip bending in the anchor in this scenario? How did you determine that that would occur and extend to this extent before it broke through? A Because the -- the force that's required to bend the -- the tip remains at about 20 to 30 tons, but as soon as it's fully bent over, there's no -- there's no further bending can take place of the tip, because the anchor, the thickness of the anchor, or the fluke of the anchor increases, so it can't bend over any more. But with the continuing pressure of the -- of the movement of the -- the downward movement of the ship onto the anchor, or rather the anchor being forced up into the bottom of the ship, the penetration, the dishing, the initial dishing and deflection of the -- of the bottom of the ship now becomes so great that it eventually punctures through. Q So what is the puncture force did you find for the -- for the hull of the ship? A Well, the puncture force occurs when you get a sufficient deflection to tear the material open, and that -- that -- the sort of force that would be required for that, and then continuing the tear in the bottom of the ship, is indicated in the -- in the lower half of this page from which you can see that the -- the forces involved in that process of the order are 40, 50 tons. THE COURT: Did you take into account any of the vertical members of the ship's hull? THE WITNESS: No, this is a shimmying that it's free from -- THE COURT: Oh. THE WITNESS: -- this is just the plating, itself, tearing. So that if it were near in the vicinity of a vertical member, a stiffener, the tear would occur alongside the stiffener, and the stiffener, itself, wouldn't -- wouldn't break away, it's the plating that would tear").

<sup>354</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 115:11-24 ("MR. LEVY: Can we go back to Video Clip 2, please? All right. Would you freeze it there, please? THE WITNESS: This is the round hole and I did not see any damage, although you may -- it's difficult to see because of discoloration here -- I did inspect this area quite carefully and I couldn't see any damage leading into that round hole. So that was, again, a bit of a puzzle as to how that isolated damage could have occurred. The only way, in my view, it could have occurred is if something had punched up through the bottom. And the majority of that fracture is a shear fracture where there is little deformation of the shell plating along the edge of the fracture, because the force or impact was such that it just sheared the plating.")

<sup>355</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 122:10-123:8 ("Q Did you reach any preliminary conclusions as a result of your inspection in February of 2005? A Following that inspection and comparing the marks on the anchor with the damage on the ship section, I was very confident that the anchor had caused this damage and -- but what wasn't clear was what -- still wasn't clear to me was how you had these two different types of damages caused by the anchor; that is the tearing damage, which I believe was caused by the fluke tip entering, and the shearing or punching damage of the round hole. Q So, you had a puzzle to put together? A Yes, I wasn't sure. I was convinced it was the anchor, there was overwhelming evidence, as far as I was concerned, that that caused the damage, but precisely or even generally how I wasn't able to do at that time. Q So, what did you do next? A Well, I returned to London and I started to puzzle how this could have happened. And we -- I say we, because I supervised one of my assistants in creating an animation to see if the anchor could initially pierce the hull with the fluke tip and then rotate and punch a hole with the top of a palm where there were score marks on it. And that we did and it showed that it was entirely feasible this could happen and indeed, in my opinion, it couldn't happen any other way.")

<sup>356</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 25:8-17 ("Q Okay. Now, if the flukes had been lying down, and the ship was able to make contact with it, what kind of damage would you, as a Naval architect who specializes in ship casualties, have expected to see? A I would have expected to have seen a deep score mark, an

indented plating leading into the punctured hole. Q Did you see any kind of indented score marks anywhere on the bottom of this ship when you looked at the ship in Mobile, Alabama? A No, I did not.")

<sup>357</sup> Trial Tr. Day 9, October 5, 2010, Crosson, at 131:5-19 ("Q Mr. Crosson, are there any observations that you've made that conclusively show that the fluke entered the hull first? A Yes. Q And what are they? A There are four significant pieces of evidence. The first is the -- I'll start with the second puncture, which is the semi-circular puncture at the forward end of the damaged area. Q If you, I think, just to assist the Judge, I have a few photos that might -- that have the round puncture. Could we show P-1090 and P-1091, please? A Yes, this is the semi-circular hole at the forward end. Q And what is it about this puncture that conclusively supports your opinion that the flukes entered first and the palm entered second?")

<sup>358</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 122:10-123:8 ("Q Did you reach any preliminary conclusions as a result of your inspection in February of 2005? A Following that inspection and comparing the marks on the anchor with the damage on the ship section, I was very confident that the anchor had caused this damage and -- but what wasn't clear was what -- still wasn't clear to me was how you had these two different types of damages caused by the anchor; that is the tearing damage, which I believe was caused by the fluke tip entering, and the shearing or punching damage of the round hole. Q So, you had a puzzle to put together? A Yes, I wasn't sure. I was convinced it was the anchor, there was overwhelming evidence, as far as I was concerned, that that caused the damage, but precisely or even generally how I wasn't able to do at that time. Q So, what did you do next?

A Well, I returned to London and I started to puzzle how this could have happened. And we -- I say we, because I supervised one of my assistants in creating an animation to see if the anchor could initially pierce the hull with the fluke tip and then rotate and punch a hole with the top of a palm where there were score marks on it. And that we did and it showed that it was entirely feasible this could happen and indeed, in my opinion, it couldn't happen any other way.")

<sup>359</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 119:5-17 ("Q We have a large photograph, actually a life-size photograph of the anchor there, can you show us on that what you're referring to? A Yes, I can. It's that top edge, the distance, the vertical distance from that to the bottom edge. Q Okay. And what does this tell you about how the accident occurred? A Well, it supports the view that the fluke -- if you accept, which I do, that the fluke came in and pierced the hull at about an angle of about 65 degrees, then the ship then forced the fluke to rotate aft, then it would be logical for these two score marks to have been caused by the two ridges of the anchor that I pointed to earlier.")

<sup>360</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 125:25-127:3 ("THE WITNESS: I believe the anchor was orientated at around 65 degrees. BY MR. LEVY: Q 65 degrees to the riverbed? A To the vertical. Q To the vertical. A And at about 40 to 45 degrees to the longitudinal center line of the ship. So, as the ship rode over it -- THE COURT: Excuse me, but you're not holding that at a 65-degree angle to the vertical, you're holding it at a 65-degree angle to the horizontal, aren't you? Vertical would be straight up, right? THE WITNESS: Yes, your Honor. Well, it's 65 degrees to the horizontal. Thank you. BY MR. LEVY: Q To the river bed? A To the river bed, yes, and about 45 degrees or 40 to 45 degrees to the longitudinal center line. And, as I said, the -- THE COURT: How about 35 degrees? THE WITNESS: Well, initially, your Honor, I wasn't certain. It was only later that I became more certain that it was about 40, 45 degrees. So, as it made contact, it would -- the plating would have trapped around this fluke tip, it would have trapped the tip and begun to rotate it aft and outboard. As it did so, this palm came up and contacted the hull and punctured the hull in the other position, the other round hole. That's my opinion of how the accident happened and how the damage was created.")

<sup>361</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 22:3-23:9 ("Q And how did you arrive at that figure? A Well, with the anchor fluke projecting up at about 65 degrees, the fluke tip would be about 6.5 feet above the riverbed. If you then take that value away from the depth at that point, and consider the draft, you will find you need 1.5 or about 1.5 feet in order to clear it. Q Okay. MR. LEVY: May I show you Exhibit P-959, please. BY MR. LEVY: Q Now, this is a drawing that you prepared, correct? A I supervised its preparation. I did not actually create it myself. Q Okay. Now, this drawing shows a 62-degree angle. Does your analysis matter whether it's 62, or 65, or 60, or what's the tolerance there? A Well, the tolerance is I can't be precise with the angle it was actually at on the day. What I've done here is do a theoretical, perfectly smooth riverbed and found that there are two support points, which you can see on the base of the anchor, and if you do that, it gives you a 62-degree angle. But we also measured this angle at the Coast Guard's yard in Baltimore with the anchor standing up at a similar angle to that, and the best estimate we obtained was about 65 degrees. Q Okay. A So it's within that range. Q All right.



Now, from the tip of the anchor -- and this is me pointing on to the screen here -- the tip of the anchor to the riverbed -- and this is a hypothetical perfectly flat riverbed, what is the distance? A Well, I adopted a distance of 6.5 feet assuming that the anchor would have penetrated the river -- riverbed up until the bottom tip of the pal")

<sup>362</sup> Trial Tr. Day 9, October 5, 2010, Crosson, at 109:19-110:5 ("BY MR. WALKER: Q Your view is that the ship struck the fluke first, right? A Yes. Q You don't know from the riverbed to the vertical at what angle that fluke existed at the time it was struck, do you? A Approximately. Q Approximately what? A Well, the normal rest position of the anchor was shown to be approximately, I believe, 76 degrees. And I stated in my report that it would be upwardly pointing. So anywhere from 76 degrees to 45, 50 degrees. As long as it's upwardly pointing.")

<sup>363</sup> Trial Tr. Day 8, October 4, 2010, Aviram, at 98:2-5 ("Q And what is your opinion? A My opinion is that flukes up scenario is the only feasible scenario which would have resulted in the damage observed.")

<sup>364</sup> Trial Tr. Day 8, October 4, 2010, Aviram, at 132:22-24 ("Q And after conducting your simulation and doing your study what did you determine about the palm first scenario? A It was entirely unfeasible.")

<sup>365</sup> Trial Tr. Day 9, October 5, 2010, Aviram, at 7:4-16 ("Q And did you -- were you able to obtain a damage pattern from the palms-first scenario that emulated the actual damage that you observed in the hull? A No. Q And did you use your best engineering judgment to obtain the best results that you could to match the damage in the hull using the palms-first scenario? A Yes. Q And you were not able to? A No. Q And in the flukes-first scenario, you were able to emulate the damage? A The general pattern of damage, yes.")

<sup>366</sup> Trial Tr. Day, 23, November 8, 2010, Langford, Day 23, at 55:18-58:4 ("MR. LEVY: Could we put up Cipriani animation No. 1, please? Now before you start playing it let me just orient everyone. Okay. BY MR. LEVY: Q Dr. Langford, the animations that we have here were prepared by Mr. Cipriani, correct? A Yes, by Mr. Cipriani, his assistant Ben Anderson. Q And his assistant, Mr. Anderson. A And I was present there to coach him as to get the sequence right. Q Right. And you attached these animations to your report in this case, correct? A Yes. Q And at your deposition you testified that you agree with the animation as presented in your report and you were not backing away from it? A That's correct. Q The animations in your report is not quite the same as the animation that you showed to the Judge today, is it? A The -- it's the same animation, it hasn't been modified. We just didn't show you as much of the animation in testimony. Q You cut the animation short, didn't you? A Sure, to avoiding boring the Court. Q With the extra two seconds? A Yes. Q Okay, let's play the whole animation. A That's fine. THE COURT: Oh, go ahead, I find it entertaining. (Laughter.) BY MR. LEVY: Q All four of these animations that we're showing you here at the same time depict the ship passing over the anchor but just different views, correct? A That's correct. Q The one up here to the right is a bow perspective view, correct? A Yes. Q And I think you looked at part of that during your testimony, didn't you? A Yes. Q And then you had two plan perspective views, correct? A Yes. Q And then we have this GPS track line view, correct? A Correct. Q And the GPS track line view shows in ten-second intervals movements of the ship, does it not? A Yes, and it does. Q Now it's very hard to see on this screen, this is as large as we can make it, but the first movement you have of the ship as shown in your bow perspective view, for example, starts at 21:02:00, correct? A I believe so, I believe it. Q And at that time you have the ship moving to port, correct? A Yes. Q And then from 21:02:00 to 21:02 10 seconds we have the ship moving forward and slightly to starboard? A Correct. Q And then at 21:02 10 seconds the ship turns or moves towards the port again? A Correct.")

<sup>367</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 136:5-7 (Q Now, you agree that in rough numbers the ATHOS weighed about 64,000 tons, right? A Correct.")

<sup>368</sup> Trial Tr. Day 32, November 30, 2010, Ractliffe, at 70:17-77:14 ("Q Okay. And this, again, this is Dr. Langford sea animation? MR. DeGIULIO: Objection. THE COURT: You're asking him, are you? MS. HENNESSY: Yes. BY MS. HENNESSY: Q Is this Dr. Langford's sea animation that you were given? A That's my understanding that it came from him, yes. Q Okay. MS. HENNESSY: Your Honor, shall we move on? THE COURT: It's up to you. You don't make any sense yet, but maybe you will some day. MS. HENNESSY: Okay. BY MS. HENNESSY: Q Did you study the forces that would be required to have the ship change direction as this track shows? A Yes. Q And what did you find? A I found the forces were a order of magnitude larger than any force that could be imposed by environmental forces, forces due to propulsion of the ship, or -- or the action of the tug, forces due to the wind, any passing ship forces, any current forces. These were always much smaller than the forces that are necessary to make the ship follow this path, this contorted path. Q And how did study the forces? A I uses the Optimoor Program for analyzing these forces in a similar way that I've described doing so for the Curie case. Q And what is

the Optimoor Program? Can you describe a little bit about that for the Judge? A Yes, it's essentially a program that looks at the movement and forces on ships that are moored, and so although it's normally used in the context of mooring problems for ships, it can be used for any situation where you have a number, a variety of forces acting on the ship. They may be mooring line forces, they may be forces due to tug action, maybe wind and current forces, any force that acts on a ship. Q And did you develop this program? A I wrote it myself, yes. Q And is it widely accepted in industry today? A It is. It is used widely by managers of mooring systems, oil companies, shipping companies, and consultants who are designing ports, anybody who has a problem with the mooring and managing of mooring ships -- of ships. Q And has it been tested for accuracy -- A It's -- Q -- the program? A It's been widely checked against other -- other software, against hand calculations, and against actual measurements on site. Q And how was the use of the program? How did you apply that in this case? A What I did was to move the ship along the track shown, and the program then will allow -- allow you to -- it gives you the forces that are required to move the ship along that track. Q All right. MS. HENNESSY: If we could show, please, P-936, which is at Tab 3, your Honor? (Pause.) THE COURT: What are we looking at -- MS. HENNESSY: Thank you. THE COURT: -- which tab? MS. HENNESSY: Tab 3, your Honor. THE COURT: Thank you. BY MS. HENNESSY: Q And does this depict -- MS. HENNESSY: Can you please put that back there the way it was, side-to-side? (Pause.) Right. That's great. Thank you. BY MS. HENNESSY: Q Does this depict the study of the movement of the vessel that you did? A Yes, this concentrates on the one part of the track where there are certain changes in direction of movement of the ship.

Q And let's talk, again, about the movement of the ship. At 2150 what direction is the ship moving in? A It's moving partly astern and partly to port. Q And then at 2102 what occurs? A There's a sharp change in direction of the movement of the ship, so that it now -- the transverse movement to port becomes suppressed, and it starts moving forward. Q And then at 2102:10 what occurs? A There was a more gradual change of the direction of the ship back again towards port, but it's still moving now in a forward direction. Q So the ship, in essentially a ten-second interval, has changed directions twice? A That's correct. Q Okay. And your Optimoor Program studies the forces that would be required to achieve that change in direction? A It enables you to find the forces that are required to cause such changes in direction of the movement of the ship. Q And what are the small red dots? A The -- the -- perhaps I can start with the large red dots. Q Okay. Please do. A The white -- well, if you go back to the white dots of those that are produced by the GPS system, my first task was to replicate the movement of the ship in the software, and I started off by defining the points of the white spots, which I've now drawn in as red spots over -- overlying the -- the white spots on the GPS system. Q And those are the large red dots? A The large red dots, yes. And because we don't have any information from the GPS system at intermediate intervals, and the program really needs to analyze the movement at less than ten-second intervals, the small red dots represent the interpolated positions of the ship at one-second intervals. So you'll find that there are nine small red dots in between each of the big red dots. The big red dots represent ten-second intervals, which are given from the GPS system, and the small red spots represent the positions of the ship at one-second intervals between those, and they were adjusted to match the white line as closely as possible. Q And -- THE COURT: Where does the white line come from? THE WITNESS: The white line is -- is the track drawn by the -- my understanding is the white line is the track drawn by the GPS system between the -- the white dots. BY MS. HENNESSY: Q And that's the line that the ship would have taken? A That's the line the ship was actually taking, yes. Q If it had followed these ten-second intervals -- A Indeed, yes. Q -- is that correct? A Yes, that's correct. Q Okay. And then did you use these tracks and the dots to calculate the forces at each of these points? A Yes, that's a close enough mesh to calculate what forces at each one-second interval, what force is required to keep the ship on that track. So that whenever there's a change of direction, you require a force to bring the ship -- to keep the ship on that track. Q And what was the result of your study? A Well, the result was a set of forces which were very large, much larger than you would expect from any -- any normal application of force from the various factors that I've discussed. Like, for example, the wind, the current, the propulsion of either the ship itself, or the -- or the tugs. A much larger force was required than you would normally expect in these circumstances. THE COURT: What conclusion did you reach, that it didn't follow the GPS track or what? THE WITNESS: Well, my conclusion -- yes, that was my final conclusion. The initial conclusion was that we had to find some way of explaining how these high forces could have arisen, and since we were unable to justify the existence of such large forces, then it could not have followed this track. Q And it's your understanding that George Langford and George Petrie believed the ship followed this track? A Yes, that's my -- what I understand, yes. Q And began, and that they testified that the ship began in a port movement, port and astern, changed when it contacted the anchor to forward and starboard, and then changed back again; is that -- MR. DeGIULIO: Objection. BY MS. HENNESSY: Q -- your understanding of the testimony of George Langford? MR. DeGIULIO: Objection, leading, your Honor, and also mischaracterizes -- THE COURT: Hold on. MR. DeGIULIO: -- the testimony. THE COURT:

Objection overruled. Go ahead. THE WITNESS: Yes, that -- that is my -- it is self-evident from the track that this is what -- what was being depicted by the GPS system.")

<sup>369</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 16:25-17:13 ("A Okay. I am still breasting over towards the dock, I'm releasing the tugboat on the port bow to come and put a line up on the starboard quarter, still turning to starboard. I want to get the vessel horizontal with the dock before I can breast it towards the dock because after you leave the anchorage there's shoals above the dock and below. So you want to get the vessel's manifold lined up with the chicksans which are right here and you want to breast the ship straight in. Q That's so you avoid the shoals to the north and south of the dock? A Yes. And now we're starting to fall aft getting the ship in line but now the ship is starting to list. I'm easing the tugs off.")

<sup>370</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 133:23-134:4 ("A In my opinion, the ship was moving diagonally aft across the anchor, it backed onto the anchor. Q So, moving to port and astern? A Correct. Q Okay. Thank you. THE COURT: Did you say that the ship was moving aft?")

<sup>371</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 29:1-31:2 ("Q Okay. Now, do you consider the movement of the ship in forming your opinion that the anchor was lying with its flukes standing up when the ship made contact with it? A Yes, I did. Q And what movement did you believe the ship was engaged in at that time? A Moving astern and to port. Q And did you find any support for that opinion in any of the ship's records? A Yes, I did. Q Where? A In the GPS positions recorded by the captain as the vessel approached the berth. Q Did you find any support for that in any other logbooks on the ship, or on any logbooks on the ship? A The -- there was the engine movement book I believe recorded that the vessel was moving astern or recorded engine movement of the vessel going astern between I think 21:00 or 21:59 hours and 21:02 hours. The engine -- THE COURT: 22:02 you mean. THE WITNESS: 21:02. THE COURT: Well, you said 21:58. THE WITNESS: Thank you for correcting me, your Honor. It was 20:59 to 21:02. THE COURT: Okay MR. LEVY: Let's put up the engine bell book, Page P-483, please, ATHOS00058. BY MR. LEVY: Q Okay. Now, is this a photocopy of the engine logbook for November 26th, 2004, for ATHOS 1? A It's a copy of the engine movement book. Q I'm sorry, the engine bell book. A Bell book, yes. Q And -- A Where -- Q Go. I'm sorry. A Where they record the engine movements of the vessel, when they're coming into or leaving port. Q Okay. And we've highlighted the word "astern," and so on that side of the page, are those when the ship's engine has been told to move astern? A That's correct. Q And what times do you see it moving astern that are relevant to your analysis? A 21:00, where I'm pointing, and 21:01, the vessel engine movement was slow astern then half astern. Q And is that at or around the time when the ship came into contact with the anchor, or just before the ship came into contact with the anchor? A In my opinion, yes. The GPS positions, the three GPS positions for the vessel show that it was close to the anchor at that time.")

<sup>372</sup> Trial Tr. Day 7, September 30, 2010, Crosson, Day 7, at 20:25-22:4 ("Q Before we go to the basis for all of these opinions, would you just describe how the incident occurred? And you may use that anchor, if you would like to. A Yes. Your Honor, if I may use your bench for a demonstration? THE COURT: Go ahead. THE WITNESS: If we think of the bench as the riverbed and the anchor sitting on the riverbed in this manner, the vessel approaching the anchor at a -- at a movement such that it's moving to port and to aft, what happens is the vessel comes in contact with the tip of the fluke, the fluke scrapes against the bottom plate. The port movement, the port-aft movement of the vessel starts rotation of the anchor and the anchor is -- is rotating about -- a vertical axis in two directions, it's rotating this way and it's rotating towards me. The tip comes in contact with the bottom plate at a hard spot near the longitudinal bulkhead of the vessel. As a result of that hard contact, the tip starts to bend as it's rotating to port. All of this is occurring in a rapid manner. So, what happens is, it bends, it's rotating, it punctures through, now it's captive by the vessel. The vessel's port movement and aft movement continues the rotation of the anchor such that the anchor is now rotating to port and to aft and, as that rotation occurs, the curled tip of the anchor punctures outward through the shell at the aft end of the damaged area and the palm, the corner of the palm punctures upward through the bottom of the shell. The anchor then falls away by its gravity, comes to rest on the riverbed, and the remainder of the hull passes safely over.")

<sup>373</sup> Trial Tr. Day 23, November 8, 2010, Langford, at 82:20-83:6 ("Q If you put it where you from your engineering judgment thought it would actually fall it wouldn't land where the actual anchor was found, correct? A It could probably land back in the hole that was formed while it was being turned by the ship and we know that it basically did that because it didn't make a series of perforations clear across the whole bottom of the ship because if it just went back onto a hard bottom it still wouldn't fit under the ship which is deeper towards the starboard than

where it was first contacted, where it first contacted the anchor. So it had to go somewhere to avoid making an even worse mess than it did make.”)

<sup>374</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 12:1-9 (“A Yes, based on the analysis that I documented in my second report, that tripping palm of the anchor was 37 inches above the sea floor -- river bed, excuse me. Q And how was the anchor oriented on the bottom, as you saw in the 2004-2005 post-incident side scan data? A Both based on the side scan sonar data and other sources of data, the anchor was lying in a position with the flukes approximately parallel to the sea floor and the tip of one fluke slightly buried and the tripping palms pointed upward.”)

<sup>375</sup> Trial Tr. Day 33, December 1, 2010, Ross, at 10:21-11:1 (“Q Did the diver report to you that the anchor was found in any kind of a depression or a hole? A No, there was no note of that. Q Would it be standard practice that if a diver found such a situation, that would be reported to you? A Yes, it would be noted.”)

<sup>376</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 85:23-86:1 (“Q And prior to November 26, 2004, did [Citgo or Carco] ever survey for obstructions? A My understanding is the survey was done by single-beam only.”)

<sup>377</sup> Rankine Dep., October 16, 2007, at 148:8-18 (“Q. Was it CITGO’s policy in 2004 to do only depth surveys? A. We too S.T. Hudson to be the experts on hydrographic surveys, they did what they did and gave us the results. We made no stipulation as to how they do the surveys. Q. You simply asked them to do a hydrographic survey? A. We simply asked them to give us the depths of the depths at our berths – at our berth in our triangle.”)

<sup>378</sup> Rankine Dep., October 16, 2007, at 162:3-10 (“Q. And the berth footprint. Okay. And we’ve talked about this a lot already, about the, that is, the policy in place in 2004 was for doing a depth survey on an annual basis for those two areas, the area of responsibility for dredging and the berth footprint; is that correct? A. That’s what it says, yes.”)

<sup>379</sup> Rankine Dep., October 16, 2007, at 172:12-173:15 (“Q. I – I’m looking at it from a little bit of a different way. Is it – was it the policy in 2004, and I’m not taking away anything from what you’ve said, was it the policy in 2004 to not survey federal waterways? A. We have no responsibility for the federal waterways, so we – we—our policy, to use your word, is to obtain hydrographic surveys only for our area of responsibility for dredging because we have no responsibility for anything outside that area. Q. Okay. I’m not asking you what you think your responsibility is or what you think the company’s responsibility is, I’m asking you if the policy in 2004 was not to survey federal waters for depth? A. We did not survey federal waters because we had no responsibility for federal waters. Q. And that was the policy in 2004? A. That is correct. Q. And 2003 and 2002? A. As long as this document’s been in place. Q. And I assume that if you are not surveying federal waterways for depth, you’re certainly not surveying them for anything else, is that correct? A. That is correct.”)

<sup>380</sup> Rankine Dep, October 16, 2007, at 193:20-24 (“Q. Now, the policy to have depth surveys conducted as opposed to other types of surveys, did you ever consider in 2004, before the ATHOS 1 incident whether that was an appropriate policy? A. No.”)

<sup>381</sup> Kamat Dep. dated February 29, 2008, at 101:23-102:9 (“Q. Yes. When you were the port captain at the Paulsboro facility, did either CITGO or the terminal have a process for identifying unknown – I’m sorry – uncharted obstruction in the berth or in the approaches to the berth? Q. At the facility? A. No.”)

<sup>382</sup> Kamat Dep, February 29, 2008, at 120:25-122:3 (“Q. When you were the port captain of the Paulsboro Terminal and you saw companies doing hydrographic surveys, did you think that they were surveying the river for anything other than the depth of the water? A. I didn’t think anything. It’s not my business. Q. Well, let me ask you a more specific question then. A. Okay. Q. When you saw companies doing hydrographic surveys in the Delaware River off the dock at the Paulsboro facility, did you think that they were surveying the river for obstructions or debris? A. I didn’t think that they were looking for obstructions and debris. Q. Okay. When you were port captain at the Paulsboro facility, did you assume that there was no obstructions or debris in the berth or in the approaches to the berth? A. I didn’t -- I didn’t assume anything. Q. Did you think that there could be obstructions or debris in the berth or the approaches to the berth? A. I didn’t think about obstructions. Q. Okay. Is it fair to say that when you were the port captain at the Paulsboro facility you didn’t give any thought, one way or the other, as to whether there might be obstructions or debris in the berth or the approaches to the berth? A. That is correct. They were checking the depths. That is all I was interested in at this time.”)



<sup>383</sup> Trial Tr. Day 28, November 17, 2010, Long, at 109:11-13 (“Q Okay. Did Carco ever request that you check the berth for obstructions or obstacles? A No, they did not.”)

<sup>384</sup> (Trial Tr. Day 10, October 6, 2010, Drager, at 43:22-44:17 (“Q In 2004, if someone at the CARCO Paulsboro facility had had a question concerning whether a ship could safely approach the berth or not at a given time, at a given draft, was there anyone whose job it was to analyze that question? A That would be the Marine Services Department in Citgo or our Port Captain, Bill Rankine. Q And no one directly with CARCO? A No. Q Were issues of maritime safety within the purview of Citgo Petroleum's Marine Operations Department? A Yes. Q And was Bill Rankine essentially the person on site in charge of marine safety issues? A Yes. Q Did you have routine contact with employees of Citgo Petroleum's Marine Technical Services Department as part of your routine functions as refinery manager? A Routine contact? No. Q Are you aware of whether CARCO had any written marine safety policy, CARCO specifically? A No, we came under the umbrella of the Citgo.”)

<sup>385</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 27:5-9 (“Q Did you or any other CARCO employee decide or have any input into when hydrographic surveys needed to be done? A If there was a recommendation by our marine technical group or our Port Captain that a survey needed to be done, we would approve that.”)

<sup>386</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 29:24-30:4 (“Q Did you or any other CARCO employee have the job responsibility of reviewing the survey information that came in and determining whether any action should be taken as a result? A The Port Captain, Bill Rankine, reviewed the surveys and he communicated with Chris Evans about his review.”)

<sup>387</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 43:22-44:17 (“Q In 2004, if someone at the CARCO Paulsboro facility had had a question concerning whether a ship could safely approach the berth or not at a given time, at a given draft, was there anyone whose job it was to analyze that question? A That would be the Marine Services Department in Citgo or our Port Captain, Bill Rankine. Q And no one directly with CARCO? A No. Q Were issues of maritime safety within the purview of Citgo Petroleum's Marine Operations Department? A Yes. Q And was Bill Rankine essentially the person on site in charge of marine safety issues? A Yes. Q Did you have routine contact with employees of Citgo Petroleum's Marine Technical Services Department as part of your routine functions as refinery manager? A Routine contact? No. Q Are you aware of whether CARCO had any written marine safety policy, CARCO specifically? A No, we came under the umbrella of the Citgo.”)

<sup>388</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 49:6-9 (“Q You relied on Bill Rankine's expertise to determine when and what type of survey should be done, didn't you? A Yes, along with the consulting firm that we used to do the surveys. But Bill was the controlling factor, yes.”)

<sup>389</sup> DeVelasco Dep., August 20, 2010, at 15:9-12 (“Q. In what department at CITGO were you employed in November of 2004? A. The health, safety and environmental department.”)

<sup>390</sup> DeVelasco Dep., August 20, 2010, at 18:12-19:15 (“Q. The HSE department in November of 2004, did it have a health and safety side and an environmental side; was it divided that way? A. Yes. Q. Okay. And which side were you on in reviews and assessments? A. I was my own department. I didn't work for environmental and I didn't work for safety. Q. Did anyone report to you in November of 2004 when you were the manager of reviews and assessments? A. No. Q. So you were a department unto yourself? A. Yes. Q. Reporting only to Allen Green? A. Yes. Q. Can you tell me approximately how many people were employed by CITGO Petroleum in the HSE department in 2004? A. No, I cannot. Q. Do you know whether there was a risk management group or a risk management function in the HSE department in 2004? A. I don't recall if there was in HSE. Was there a marine safety group within the HSE department? A. No.”)

<sup>391</sup> DeVelasco Dep., August 20, 2010, at 34:20-36:14 (“Q. Were you in charge of this review team – A. Yes. Q. –for purposes of the review? A. Yes. Q. And what was Mr. Cheesman's area of expertise – subject matter expertise? A. Environmental was his primary expertise. Q. And what does that mean; environmental? A. Regulatory requirements issued by the Environmental Protection Agency and appropriate state agencies. Q. What was Mr. Andrews' position with CITGO Petroleum at the time of the November 2004 review? A. Industrial hygiene. Q. And was that his area of subject matter expertise? A. Yes. Q. Renae Schmidt; what was her position with CITGO Petroleum in November of 2004? A. She was in the environmental department. Q. Do you remember what her title was? A. No. Do you remember what her subject matter expertise was? A. Environmental and safety. Q. Okay. You've explained what environmental was. I think you explained it essentially as state and federal regulatory

compliance. What does safety mean, for purposes of working in a safety department? A. Of Renae being in the safety department? Q. Yes. A. Well, she was in the environmental department but she had expertise in environmental and safety. Q. Did her expertise involve anything to do with marine safety? A. No.")

<sup>392</sup> DeVelasco Dep., August 20, 2010, at 39:8-40:11 ("Q. Okay. To simplify our discussions going forward, I'm going to refer to marine safety matters as the matters that I just went over with you. And we can go over them again, if you'd like. When I'm talking about safety at the berth and the approaches to the berth, safety of the dock structure and the river bottom, types of hydrographic surveys that can be done, exchange of information between the ship and the terminal as the ship is approaching the berth, what to do in emergency situations such as a thunder storm while the ship is alongside the berth, and communications between the terminal and the ship with respect to the maximum allowable draft at the berth, I'm going to refer to all that collectively as marine safety issues. Okay? A. Yes. Q. When I'm talking about marine safety issues, I'm not talking about regulatory compliance. I'm not talking about Coast Guard requirements for the dock. Okay? A. Yes. Q. Did anyone, as far as you can recall, in 2004, in the health, safety and environmental department, have subject matter expertise of any of these safety matters that I've just discussed with you? A. No.")

<sup>393</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 52:14-53:1 ("Q Are these Marine Operations Guidelines? A Yes. Q Were these in effect when the ATHOS called? A Yes. MR. WALKER: Let's look at Page 266, Paragraph 1. BY MR. WALKER: Q Where were the depth surveys to be obtained that this refers to? A What we call the permitted dredge area for our dock or the area of responsibility. Q Okay. Did the draft standards say anything about searching for obstructions? A No.")

<sup>394</sup> Rankine Dep., October 16, 2007, at 172:23-174:5 ("Q Okay. I'm not asking you what you think your responsibility is or what you think the company's responsibility is, I'm asking you if the policy in 2004 was not to survey federal waters for depth? A. We did not survey federal waters because we had no responsibility for federal waters. Q And that was the policy in 2004? A. That is correct. Q And 2003 and 2002? A. As long as this document [Exh. P-4, "CITGO Marine Operations Guidelines"] been in place. Q And I assume that if you are not surveying federal waterways for depth, you're certainly not surveying them for anything else; is that correct? A. That is correct. Q And that was the policy in 2004? A. We -- we are not permitted to survey federal waterways, those are federal waterways, we're not allowed to survey federal waterways, the Army Corps of Engineers surveys federal waterways. We cannot willingly go out and survey federal waterways. Q What makes you think that you can't survey federal waterways? A. We were told not to survey federal waterways. We were told during the ATHOS I not to survey federal waterways. We've been told in other ports that's not our responsibility and we are not to survey federal waterways, the federal government surveys federal waterways.")

<sup>395</sup> Trial Tr. Day 13, October 13, 2010, Brooking, at 47:3-10 ("Q Why is it relevant to be surveying for obstructions in the turning area? A Because you've reduced your margins of safety, and you're bringing in vessels with relatively little under keel clearance, and the chance of striking an obstruction or grounding, and having a similar result to striking an anchor, you'd have an oil spillage. Then it's a prudent thing to do and a risk analysis would show you that.")

<sup>396</sup> Rankine, Dep. dated October 16, 2007, at 145:3-146:4 ("Q. It's not a survey for obstructions or debris; is that correct? A. I don't -- I'm not the one that does the surveys, so I don't know what they're looking for while they're doing the survey. Hudson Engineering is the ones that we used in Paulsboro for that. Q. In 2004, did you think that a hydrographic survey was a survey for depth -- for obstructions? A. Not particularly, no, but I -- I would imagine that if they found something, they would let us know. Q. Did you know one way or the other in 2004 whether a hydrographic survey was adequate to tell the surveyor whether there was an obstruction on the bottom of the river? THE WITNESS: My -- we relied on Hudson to tell us, to do the hydrographic surveys, and if they were able to determine something, I would expect them to tell us at the berth in the triangle.")

<sup>397</sup> Rankine Dep. dated October 17, 2007, at 25:25-26:14 ("Q. Did you understand in November of 2004, when you received this survey from S.T. Hudson, that the survey does not provide any information or data between the survey lines? A. Yes. Q. Did you understand in November of 2004, before the ATHOS I incident, that the survey soundings, each individual sounding itself doesn't identify the nature of the depth, whether you are hitting the bottom, whether you are hitting a fish or whether you are hitting an obstruction; did you know that? A. Yes.")



<sup>398</sup> Trial Tr. Day 28, November 17, 2010, Long at 79:3-14 (“Q And that's why a hydrographic survey is not intended to look for or determine the existence of obstructions, correct? A That is correct. It is for determining depths of water. THE COURT: Do you compare your depth determinations this year with the previous year? THE WITNESS: We normally do not do that. THE COURT: Thank you. BY MR. WALKER: Q That's a later question, but the Judge has addressed it, you don't analyze the data, you just give it to your client? A That is correct. Once we prepare our hydrographic drawings, we then submit that to our clients.”)

<sup>399</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 9:21-24 (“Q And who would be responsible for providing guidance to the terminal on issues relating to marine safety at the berth? A That was my job, marine safety, marine guidance.”)

<sup>400</sup> Trial Tr. Day 30, November 22, 2010, Rankine, Day 30, at 10:9-11 (“Q And who did the Marine Services Technical Manager rely on for expertise regarding marine safety at the terminal? A That would be me.”)

<sup>401</sup> Trial Tr. Day 30, November 22, 2010, Rankine, Day 30, at 86:15-88:7 (“Q Mr. Rankine, did you have any education, experience or training in the types of hydrographic surveying techniques that were available in 2002 that could determine whether there were obstructions to navigation at a berth or in the approaches to a berth? MR. WALKER: Same objection. THE WITNESS: That's way too much, Judge, I don't even know what he's asking me there. MR. LEVY: All right, I'll break it down for you then. THE COURT: He wants to know your knowledge of hydrographic survey techniques. Did you have any training in hydrographic surveys? THE WITNESS: I didn't do hydrographic surveys. So, no specific training in hydrographic surveys, no. BY MR. LEVY: Q And, in particular, the types of hydrographic surveys that could help us determine or could help a person determine whether there were obstructions to navigation in the berth area or in the approaches to the berth? MR. WALKER: Your Honor, again I must object, that's not part of my direct examination. THE COURT: I know, it's got nothing to do with anything. Go ahead. BY MR. LEVY: Q You may answer. A Well, the only answer I can give you is in reference to the berth, I cannot talk to the approaches. We had nothing to do with the approaches, the approaches are the Army Corps of Engineers. THE COURT: We understand that. The question is, did you have any training in hydrographic surveys that would determine obstructions? THE WITNESS: In taking hydrographic surveys, no. THE COURT: Thank you. BY MR. LEVY: Q Did you gain any such experience in hydrographic surveys that would look for obstructions at any time between the time you started in January of 2002 and before the date of the accident, November 26th, 2004? MR. WALKER: Objection, beyond the scope. THE COURT: It is indeed. THE WITNESS: No.”)

<sup>402</sup> Rankine Dep., October 16, 2007, at 41:17-42:9 (“Q. As a marine technical surveyor for Caleb Brett, from 1983 to your end of employment there at the end of 2001, did you have any experience in reading hydrographic surveys like the types that were done for CITGO Petroleum by S.T. Hudson? A. No. Q. So am I correct in saying that that the first time you had any involvement with reading hydrographic surveys, like the ones done by S.T. Hudson for CITGO Petroleum, was after you started working for CITGO Petroleum in 2002? A. Yes. Q. Prior to working for CITGO Petroleum and starting to work for CITGO Petroleum in January of 2002, did you have any experience or involvement with dredging operations? A. No.”; “Q. My question then is: Before you started your position in January of 2002, did you receive any training in those areas from CITGO Petroleum? A. No. Q. At any time after 2002 did you receive any formal training from CITGO concerning hydrographic surveys? A. No. Q. At any time after 2002 did you receive any formal training from CITGO Petroleum concerning side scan sonar surveys? A. No. Q. Did you receive any formal training from CITGO anytime after you started in January of 2002 concerning dredging operations? A. No.”)

<sup>403</sup> Rankine Dep., October 16, 2007, at 43:7-12 (“Q. So am I correct in saying that -- that when you started with CITGO Petroleum in January 2002 you had no experience with hydrographic surveys, no experience with dredging, and no experience with side scan sonar surveys? A. That is correct”)

<sup>404</sup> Rankine Dep., October 16, 2007, at 56:11-23 (“Q. My question then is: Before you started your position in January of 2002, did you receive any training in those areas from CITGO Petroleum? A. No. Q. At any time after 2002 did you receive any formal training from CITGO concerning hydrographic surveys? A. No. Q. At any time after 2002 did you receive any formal training from CITGO Petroleum concerning side scan sonar surveys? A. No.”)

<sup>405</sup> Rankine Dep., October 16, 2007, at 75:3-23 ("Q. Under the paragraph, marine technical support, paragraph number two, the first sentence reads: "Marine technical support performs tanker and barge performance and provides marine expertise regarding marine safety for the facility." When you were hired by Bob Williams in late 2001, started in 2002, did you tell him that you have marine expertise in providing guidance to the terminal and to the company on the safety of the berth and the area surrounding the berth? THE WITNESS: No.")

<sup>406</sup> Rankine Dep., October 16, 2007, at 76:13-20 ("Q. Did you hold yourself out to anyone at CITGO Petroleum as an expert in that area of marine safety? A. No. Q. Did you feel personally that you had expertise in that area of marine safety when you started with CITGO of January 2002? A. No.")

<sup>407</sup> Rankine Dep., October 16, 2007, at 116:1-7 ("Q. I know I've asked you about training that you've received from -- from CITGO concerning hydrographic surveys, did you receive any training from CITGO Petroleum while you were port captain before November 26, 2004 on the different types of surveys that are available? A. No.")

<sup>408</sup> Rankine Dep., October 16, 2007, at 116:21-117:6 ("Q. In 2004, did you know about side scan sonar surveys -- MR. LEBLANC: Object to the form of the question. BY MR. LEVY: Q. -- before November 24, 2004? A. No. Q. In 2004, before November 26, 2004, did you know about multibeam surveys? A. No.")

<sup>409</sup> Kamat Dep. dated February 29, 2008, at 44:16-24 ("Q. When you were hired by CITGO Petroleum in the end of 1997, at that time did you have any experience in reading hydrographic surveys? A. No. Q. And at that time did you have any experience in evaluating berths to see if they were safe for ships to moored at? A. Experience? No.")

<sup>410</sup> Kamat Dep. dated February 29, 2008, at 45:18-46:5 ("Q. Okay. What training did you receive, if any, from CITGO or anyone acting on behalf of CITGO for the position of port captain? A. They -- I don't really -- I don't remember precisely if they sent us to taking a few courses for marine spill response and to be able to be qualified as -- qualified individual and some management courses, like I think meeting -- meeting the press and what comes -- what they want to send us. I think nothing big thing that I can remember now to pinpoint.")

<sup>411</sup> Kamat Dep. dated February 29, 2008, at 46:24-47:12 ("Q. Okay. Do you have a recollection of receiving any training from CITGO on evaluating whether a berth was safe for ships to approach that berth or not safe? A. No. Q. Do you recall receiving any training from CITGO at any time when you were port captain on the different types of hydrographic surveys that can be performed? MR. LeBLANC: Object to the form of the question. A. No.")

<sup>412</sup> Kamat Dep. dated February 29, 2008, at 120:14-121:6 ("Q. When you were the port captain of the Paulsboro Terminal and you saw companies doing hydrographic surveys, did you think that they were surveying the river for anything other than the depth of the water? A. I didn't think anything. It's not my business. Q. Well, let me ask you a more specific question then. A. Okay. Q. When you saw companies doing hydrographic surveys in the Delaware River off the dock at the Paulsboro facility, did you think that they were surveying the river for obstructions or debris? A. I didn't think that they were looking for obstructions and debris.")

<sup>413</sup> Kamat Dep. dated February 29, 2008, at 167:9-18 ("Q. ...My question was, when you were the port captain at the Paulsboro Terminal, did you know how to survey for debris and obstruction? A. Do you know is what you said? Q. Did you know how to survey for debris -- A. Did I know how to survey -- no. I don't even know then and I don't even know now.")

<sup>414</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 27:5-9 ("Q Did you or any other CARCO employee decide or have any input into when hydrographic surveys needed to be done? A If there was a recommendation by our marine technical group or our Port Captain that a survey needed to be done, we would approve that.")

<sup>415</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 140:22-143:22 ("Q Okay. Did you form an opinion regarding how much it would have cost Citgo to conduct a side scan sonar survey and analysis of that data of the entire approach, from the channel to the Paulsboro dock? A Yes, I did. Q And what was your opinion? A I figured

out that it would cost them between \$7500 and \$11,000 in 2004 to conduct that survey. Q And how did you arrive at that estimate? A Having done a lot of work on the river, I basically just costed out a day rate for equipment, boat, and a specialist, another day for analyzing the data, and then some additional time for auto CAD and word processing. Q By the way, in your work with terminals, and with other companies along the Delaware River, did you ever need to obtain any kind of permit from the Army Corps of Engineers, or anyone else, in order to search into an anchorage, or into a federal channel, using side scan sonar? A There's no permitting required to do the survey. MR. LEVY: If we could look at Figure 5A, please, from Mr. Capone's September 8th report? It's P-990. BY MR. LEVY: Q Now, this is similar to the one we showed before, I think. Can you just quickly explain for us how you created this image? A Yes, in the same manner as previously. We take a satellite image of the area it's got coordinates with it, that becomes the basis for the image. As we add on other aspects of the image, they all have coordinates, and that's how they're placed onto the image, whether it's the survey data from S.T. Hudson or the channel. We use, you know, the coordinate system to accurately place all the items on the chart. Q Did you start with a satellite photograph? A Yes, I did. Q Okay. And then you imported the other data to create the lines that are shown on there? A That is correct. Q All right. Do these lines that you've put onto this satellite image, fairly and accurately depict the Delaware River channel, the Mantua Creek Anchorage, and the S.T. Hudson survey that was done by, or done for Citgo in October of 2004? A Yes. Q And does it also fairly and accurately depict the approximate anchor recovery position? A The approximate position. Q Okay. Now, could you identify for us on this exhibit what area you would have surveyed -- could have surveyed for Citgo and that you've formed an estimate of 7500 to \$11,000 to do that side scan sonar survey? A Yes, that -- for that cost, I was looking at an area that sort of starts slightly behind the facility, angles out to the channel here, comes up about, approximately to here, and then down, so you have the entire approach to the facility. Q Okay. MR. CALDER: Objection. THE COURT: Overruled. BY MR. LEVY: Q In November of 2010 -- I'm sorry -- 2004, how many times had you given such estimates for side scan sonar surveys on the Delaware River? A Dozens and dozens, if not hundreds. THE COURT: Excuse me, but you said in November of 2004. MR. LEVY: I apologize, your Honor. Let me rephrase the question. Thank you. BY MR. LEVY: Q Prior to November of 2004, approximately how many times had you given estimates for doing side scan sonar searches along the Delaware River? A That's what I thought you said the first time. Q I did not. A I'm sorry. Dozens and dozens, and just numerous times. Q Did you arrive at this estimate independently? A Yes, I did.")

<sup>416</sup> Trial Tr. Day 28, November 17, 2010, Long, at 121:12-19 ("Q Now, if instead of the same geographic area that you conducted your hydrographic survey, the 800 feet out, instead you extended the survey out to the edge of the channel, the edge of the Federal Channel, which I'll represent to you is roughly 2200 feet out from the dock, how much would that have increased the cost of the survey? A I would tell you that we would estimate somewhere between 25 and \$30,000.")

<sup>417</sup> Trial Tr. Day 28, November 17, 2010, Long, at 123:8-24 ("Q Do I understand your prior testimony correctly, however, that in those instances when Hudson performed a side-scan survey, they actually subcontracted the side-scan work to some other company? A Yes, what we would do with our hyd -- side-scan surveys is there's a single low (ph) consultant that has the side-scan survey, so we then bring him aboard our boat with our supervision, and utilize his side-scan equipment to do the survey. THE COURT: But if you have your own, if you wanted to? THE WITNESS: We do not employ our own side-scan survey. THE COURT: Oh, you don't -- THE WITNESS: But -- THE COURT: -- you don't have the equipment? THE WITNESS: We do not have the equipment.")

<sup>418</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 58:12-14 (Q: And as head of that facility what approximately was the amount of gross revenue that you would have had in 2004? A It was somewhere between 200 and \$250 million.")

<sup>419</sup> Rankine Dep, Oct. 16, 2007, at 248:23-249:12 ("Q. Before that time, actually, before the ATHOS I incident on November 26, 2004, did you assume that there was no obstructions to navigation in the federal anchorage, Anchorage No. 9 -- 9? MR. LEBLANC: Objection to the form of the question. THE WITNESS: No. BY MR. LEVY: Q. Do you believe there were obstructions out there? A. It wouldn't have surprised me. Q. Why wouldn't that surprise you? A. Because ships lose anchors.")

<sup>420</sup> Kamat Dep, Feb. 29, 2008, at 124:24-126:12 ("Q. ... Did you hear that the ship had hit an uncharted obstruction, in particular an abandoned anchor? A. Yeah, I heard of that. Q. Were you surprised to hear that it hit an anchor? A. Not surprised. Q. Why were you not surprised? A. If the ship is anchored -- some other ship anchored in the river, and when they hit the anchor and the anchor gets entangled and she picks on up the cable and she does

not tell anybody, voila, nobody would ever know because the ship is picking up the anchor to sail out. So when they pick up the anchor -- only the cable, they don't see the anchor. They don't tell anybody, nobody would ever know. It could have happened with some other ship before that. Who knows? Because it was in that anchor area. That's what I understand. Q. So a ship abandoning an anchor or losing an anchor in an anchorage doesn't surprise you? A. No.")

<sup>421</sup> Williams Dep, Jan. 16, 2008, at 139:9-12; 140:6-9, 12-14 ("Q. Did you know, when you were manager of the Technical Services Department, that there sometimes can be debris and obstructions in the berth to a facility? A. I'm -- I was aware, and am aware, it can happen . . . Q. My question is simple: When you were manager of the Technical Services Department, did you know that there could be obstructions and debris in federal waterways? . . . A. Well, the answer would have to be yes, I am aware it could happen. The word 'could.'")

<sup>422</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 19:13-17 ("THE COURT: Before you noticed the list or at any time did you hear any noise that led you to believe that the ship had contacted something untoward? THE WITNESS: No, I did not, your Honor, I did not feel or hear anything.")

<sup>423</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 55:25-56:6 ("Q And none of those ships ever went aground or contacted anything in the Federal anchorage, right? A I don't know. Q I'm asking about the ones you were on? A I could have touched that anchor and not opened up the ship. I never felt it when I did so I don't know if I could have contacted it before and just not put a hole in it.")

<sup>424</sup> Trial Tr. Day 11, October 7, 2010, Bowman, at 134:20-135:9 ("Q So, if a ship passes over it and coming from our left to right, looking at this video, the ship could come in -- a ship could come in contact with it without making the anchor actually fall over flat, is that correct? A Correct, it would -- it could come back up again once the ship has passed. Of course it would do some scraping damage across the bottom of the hull, but you wouldn't know necessarily that you had made contact with the anchor. Q And as a person who inspects ships in dry dock on a regular basis, do you often see that kind of damage on the bottom of a ship, scrapes and bumps that you don't know where they came from? A That's correct, you do. And it's often the case that you just simply can't pin down how or when that happened, that damage happened.")

<sup>425</sup> Trial Tr. Day 12, October 12, 2010, Bowman, at 112:23-113:24 ("Q You can't rule out the possibility that the position of the anchor changed a week before, or even a day before this incident occurred, can you? A I can't rule that out. Q You know that there's evidence that hundreds of vessels with drafts as deep or deeper than the ATHOS maneuvered through the anchorage, over the anchor's location, in the months and years preceding the incident? You're aware of that, right? A That must be correct, but may I just add something to what you said? THE COURT: Go ahead. THE WITNESS: It, of course, depends on all the factors involved with this accident, of course, the way the vessel was turning, the position of the hull, and the direction of the hull, that's all important. Because this anchor to be what I do say is for this anchor to have been -- to pierce by the fluke tip it had to snag, or get caught, or trapped in the hull plating. There may have been many other occasions when ships have passed over this anchor, even in an elevated position, and you would never know about it. It just passed over the hull, it scraped the bottom, or knocked it over, and you wouldn't know until you got to dry dock. And that often happens, you find damages on the bottom of the ship which there may be indentations, even score marks, and you don't know how it's occurred. The unique or fairly unique thing is here its punched at the hull.")

<sup>426</sup> Barnes, Dep. dated August 12, 2009, at 63:8-21 ("Absent notice from any source of a hazard to navigation in a federal project area, what's your understanding of what the Army Corps does on the Delaware River prior to November 26, 2004 with respect to looking for potential obstructions to navigation? A. None of the agencies routinely look for hazards to navigation. It's kind of like chasing a needle in a haystack that may not even be in the haystack. What it requires to normally find those hazards is very expensive and fruitless if there's no thought that there may be a hazard in that area. So they don't. Q. They don't routinely look? A. No.")

<sup>427</sup> Barnes, Dep. dated August 12, 2009, at 67:13-68:11 ("Q. If you turn to page 4 of your report, in the very last paragraph you wrote, 'The Corps of Engineers, NOAA and the Coast Guard do not routinely use multi-beam and side scan sonar to search for unknown relatively small hazards to navigation.' We talked a little bit about this before and I want to focus just on the Army Corps -- A. Okay. Q. -- for purposes of these questions. Do you know what the policy or the procedures that were being followed by the District of Philadelphia Army Corps of Engineers to search for, on a routine basis, hazards to navigation along the Delaware River? A. The engineer



manual that all of the Corps districts adhere to, that's our Bible, addresses surveys for haz -- hazards to navigation, and it says in that directive or that manual that the primary means of identifying and locating hazards to navigation are multi-beam surveys and side scan sonar, but we don't routinely just go looking for them. None of our districts do. It's too expensive. We wait until we have a report that there is one, whether it be a report from us, the public or whoever.")

<sup>428</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 27:4-15 ("Q How big is Mantua Creek anchorage? A About 2.8 miles long. Q And how much of that anchorage do you need to utilize when berthing a ship at Citgo? A Just the southern end here. Q Okay. A Up to here about. Q Is it roughly within the boundaries of those two red lines that we've drawn, approximately? A Yes, it is. Q That's where we've kind of labeled it No. 7? A Yes.")

<sup>429</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 28:4-18 ("Q Okay. Could you show us the area of the anchorage that docking pilots utilize going into Citgo? A Most docking pilots, if not all of us for at least the last 100 years have always used this area right in here. Q And that's -- A About the length of a ship. THE COURT: And that's up river from the straight line between five and six. THE WITNESS: It's -- it begins off of 1F, your Honor, over towards the dock. It also goes up about maybe a thousand feet and that's where you turn a larger ship. And you would have to go through this part of the anchorage to get to the Citgo dock, there's no other way. All the ships that I've docked that come from sea so you're using this other, there's no reason to use the upper end.")

<sup>430</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 121:19-23 ("Q Right. If you want to find obstructions, you either have to do a wire drag, or side scan sonar surveys, something like that? A Those types of methods are typically used to find obstructions in between your soundings.")

<sup>431</sup> Trial Tr. Day 33, December 1, 2010, Ross, at 9:13-23 ("Q Okay, can you just explain for the Court, what were the conditions under which you were able to dive in Mantua Creek? Was it any time of the day or a certain stage of the tide? A No, only during slack water periods that we conducted our dive. Q And how long does a slack water period last, approximately? A Generally, 45 minutes to an hour, tops. Q And how many times a day did you dive in slack water? A Daylight hours, usually twice a day, depending on, you know, how the slack water period is.")

<sup>432</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 30:16-31:22 ("MR. BERGERE: Can we have 1138? BY MR. BERGERE: Q Mr. Fish, can you describe what this is? A This was one of the anomalies that we located during the quick, early survey of the Mantua Anchorage. I hope I'm using the correct terminology for where we were. To me it was a very interesting feature. It's different than the surrounding seabed. That arrow was just to point out what we call an acoustic shadow, the white area. This white area is the track of the ship and the track of the sonar. Q When you say "the ship," you're talking about the vessel, the ship that is pulling the sonar -- A Sonar, I'm sorry. Q -- fish at this point? A The survey vessel. When I talk about the vessel, it will be typically be the survey vessel. Q And the white track is actually directly below the two fish? A That's correct, and because it takes some time for the sound to get to the bottom before the first reflection comes back, unless there are animals in the water column above the bottom, that was usually white. This was clearly a man-made target to me, because it has a curving feature, it has -- it's got some density, and if you look closely, you can see small ribs here. Now, we didn't know what that was, but we knew that it was a significant anomaly. Oh, thank you. Here's the ribs that you can see if you blow it up. I call them ribs because I know now they were, but they're distinctive features for a target underwater.")

<sup>433</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 36:6-37:25 ("Q Can you describe what we're looking at in 1163? A Yes, this is a sonar pass. The same kind of sonar data. Here we have the path of the vessel, the path of the two fish, and, again, it's white because it takes some time for the acoustic beam to reach the bottom, and it registers no reflections during that time. And this is the -- the bottom of the riverbed, and out to the right of the sonar tow, and this is the bottom of the riverbed, and out to the left. And it's called a side scan because it takes time for that sonar beam to propagate out and bounce back, and if there are things sticking out, or protruding, standing off the substrate or the sediment, we can see that with higher reflections and some shadows behind them, and also there are areas of softer sediment. In this case, I believe this might be oil, but it looks like a muddy -- a muddy substrate. That's probably a muddy substrate. This target here -- we found two other targets in the anchorage area during our first survey, and we didn't know what they were, but this is clearly a hard target with a shadow. It has some altitude. And this one is also a hard target with some altitude to it. Q And these are -- you call these sonograms? A Sonograms. Q Sonograms. And these are sonograms that are printed from your data, the data from your surveys? A That's correct. Q And that's true with all the sonograms we've looked at so far? A That's correct. Q Okay. And -- THE COURT: What about the line up above that doesn't have a circle around it? THE WITNESS: This one? BY MR.

BERGERE: *Q* Yes. *A* That, I believe, and we had it checked by divers, is a mound of sediment that was -- we don't know what created it, but it's a sediment that's been pushed, as if something large had settled in the bottom and moved sideways, so it built up a little mound of sediment. *Q* Now, the object circled in the lower right, what did you determine that to be? *A* Well, we did the positioning, and put the divers on it, and it was determined to be an anchor.

<sup>434</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 47:15-21 (“*Q* So at the completion of the first set of surveys you performed with the Kline 3000 system that you described at the end of November of 2004, were you able to -- was the equipment able to both detect, and you were able to recognize the anchor, the pump casing, the concrete block, and the scour line? *A* That's correct.”)

<sup>435</sup> Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25 (“*Q* The search that the Army Corps conducted at Mantua Creek Anchorage, after the ATHOS incident, was done using multi-beam sonar, correct? *A* Yes. *Q* And the NOAA survey vessel was using side scan sonar, right? *A* Yes. *Q* And as a result of these searches, there were several objects found lying on the bottom of Mantua Creek Anchorage, correct? *A* Yes.”)

<sup>436</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 85:22-25 (“*Q* Now, during this initial phase in early December you also used the divers from Rand Dive, to dive on designated targets that you would see in the side scan data? *A* I believe I did.”)

<sup>437</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 30:16-31:22 (“MR. BERGERE: Can we have 1138? BY MR. BERGERE: *Q* Mr. Fish, can you describe what this is? *A* This was one of the anomalies that we located during the quick, early survey of the Mantua Anchorage. I hope I'm using the correct terminology for where we were. To me it was a very interesting feature. It's different than the surrounding seabed. That arrow was just to point out what we call an acoustic shadow, the white area. This white area is the track of the ship and the track of the sonar. *Q* When you say "the ship," you're talking about the vessel, the ship that is pulling the sonar -- *A* Sonar, I'm sorry. *Q* -- fish at this point? *A* The survey vessel. When I talk about the vessel, it will be typically be the survey vessel. *Q* And the white track is actually directly below the two fish? *A* That's correct, and because it takes some time for the sound to get to the bottom before the first reflection comes back, unless there are animals in the water column above the bottom, that was usually white. This was clearly a man-made target to me, because it has a curving feature, it has -- it's got some density, and if you look closely, you can see small ribs here. Now, we didn't know what that was, but we knew that it was a significant anomaly. Oh, thank you. Here's the ribs that you can see if you blow it up. I call them ribs because I know now they were, but they're distinctive features for a target underwater.”)

<sup>438</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 36:6-37:25 (“*Q* Can you describe what we're looking at in 1163? *A* Yes, this is a sonar pass. The same kind of sonar data. Here we have the path of the vessel, the path of the two fish, and, again, it's white because it takes some time for the acoustic beam to reach the bottom, and it registers no reflections during that time. And this is the -- the bottom of the riverbed, and out to the right of the sonar tow, and this is the bottom of the riverbed, and out to the left. And it's called a side scan because it takes time for that sonar beam to propagate out and bounce back, and if there are things sticking out, or protruding, standing off the substrate or the sediment, we can see that with higher reflections and some shadows behind them, and also there are areas of softer sediment. In this case, I believe this might be oil, but it looks like a muddy -- a muddy substrate. That's probably a muddy substrate. This target here -- we found two other targets in the anchorage area during our first survey, and we didn't know what they were, but this is clearly a hard target with a shadow. It has some altitude. And this one is also a hard target with some altitude to it. *Q* And these are -- you call these sonograms? *A* Sonograms. *Q* Sonograms. And these are sonograms that are printed from your data, the data from your surveys? *A* That's correct. *Q* And that's true with all the sonograms we've looked at so far? *A* That's correct. *Q* Okay. And -- THE COURT: What about the line up above that doesn't have a circle around it? THE WITNESS: This one? BY MR. BERGERE: *Q* Yes. *A* That, I believe, and we had it checked by divers, is a mound of sediment that was -- we don't know what created it, but it's a sediment that's been pushed, as if something large had settled in the bottom and moved sideways, so it built up a little mound of sediment. *Q* Now, the object circled in the lower right, what did you determine that to be? *A* Well, we did the positioning, and put the divers on it, and it was determined to be an anchor.

<sup>439</sup> Trial Tr. Day 6, September 29, 2010, Fish, at 47:15-21 (“*Q* So at the completion of the first set of surveys you performed with the Kline 3000 system that you described at the end of November of 2004, were you able to -- was the equipment able to both detect, and you were able to recognize the anchor, the pump casing, the concrete block, and the scour line? *A* That's correct.”)



<sup>440</sup> Trial Tr. Day 10, October 6, 2010, Olson, at 156:15-25 ("Q The search that the Army Corps conducted at Mantua Creek Anchorage, after the ATHOS incident, was done using multi- beam sonar, correct? A Yes. Q And the NOAA survey vessel was using side scan sonar, right? A Yes. Q And as a result of these searches, there were several objects found lying on the bottom of Mantua Creek Anchorage, correct? A Yes.")

<sup>441</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, 119:23-120:2 ("Q Okay. When the Army Corp performed hydrographic surveys of the federal project on the Delaware River, they would provide copies of those hydrographic survey drawings to anybody who asked for them, right? A Yes.")

<sup>442</sup> Trial Tr. Day 22, November 4, 2010, Traykovski, at 50:17-51:3 ("Q In applying the 41 inch measurement you took of the height of the anchor, based on the 2001 data and applying that to your depths, what is the range of depth of water above the anchor, with those shallower depths? A So, that half-foot shallower would bring the anchor to the tip of the tripping palm to 37.5 plus or minus .3. Q And the range would be what? A So, that would be 37.2 to 37.8. THE COURT: What depth of -- what tide did you assume? THE WITNESS: So, this is all based on mean lower low water.")

<sup>443</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, Day 10, at 98:12-99:2 ("Q Does the Philadelphia District of the Corp have a mission to search for debris in the Delaware River project? A No. Q What is your mission with respect to obstructions in the Delaware River project? A When the corp is notified of an object or an obstruction, by an outside party, at that point, we mobilize our survey crews and attempt to travel to the location and report it to us and determine if the object or obstruction is a hazard to navigation. THE COURT: And if it is, do you remove it? THE WITNESS: If it is a hazard to navigation and we aren't able to determine who the owner of that object or the cause of that is, we get together with the Coast Guard and determine a joint -- in a joint decision, that it is a hazard and we'll move to contract that work and remove the object.")

<sup>444</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, Day 10, at 98:15-100:5 ("Q What is your mission with respect to obstructions in the Delaware River project? A When the corp is notified of an object or an obstruction, by an outside party, at that point, we mobilize our survey crews and attempt to travel to the location and report it to us and determine if the object or obstruction is a hazard to navigation. THE COURT: And if it is, do you remove it? THE WITNESS: If it is a hazard to navigation and we aren't able to determine who the owner of that object or the cause of that is, we get together with the Coast Guard and determine a joint -- in a joint decision, that it is a hazard and we'll move to contract that work and remove the object. Q You mentioned that you get together with the Coast Guard to determine whether or not it is, in fact, a hazard to navigation. What factors do you use to make that decision? A The first thing we do is to determine whether it's within the federal project boundaries. If it is within the federal project boundaries, we then make a determination whether or not the object is sticking up above the authorized project depth of the particular project. If that is the case and the area is being used frequently by the maritime industry, we will then, with the Coast Guard, jointly determine that it is a hazard to navigation. And if that's the case, the first thing we'll do is mark the object with a buoy and send a diver down to try and determine who the owner of that object is, if possible. At that point, if we haven't ascertained who the owner is, we will do a contracting action and we'll get somebody out there to remove the object. Q Do you notify anyone that there's an obstruction to navigation, once you've made that determination? A We'll notify the Coast Guard, but they're normally in on the whole action. But we will notify the Coast Guard and we will tend to give the pilots a call, also. Q Why do you notify the Coast Guard? A They're responsible for broadcasting the notice to mariners, that would warn the maritime community of the hazard. Q And was this your practice in 2004? A Yes.")

<sup>445</sup> Trial Tr. Day 24, November 9, 2010, Barnum, at 3:20-6:21 ("Q Good morning, Captain Barnum. You have recently retired from your position as the Director of Office of Coast Survey for NOAA, correct? A Yes. Q Could you explain for the Court what the acronym NOAA stands for? A It stands for the National Oceanic and Atmosphere Administration. Q And from April of 2006, until the time you retired, you were the Director of NOAA's Office of Coast Survey? A Yes. Q And in November of 2004, around the time of the ATHOS, you were serving as the chief of the Navigation Services Division -- A Yes. Q -- of the Office of Coast Survey? A Yes. Q All right. And prior to serving in the Office of Coast Survey, you served on various NOAA hydrographic survey vessels, correct? A Correct. Q And that included the WHITING and the LITTLE HAILS between July 2001, until August of 2003? A Yes. Q And earlier you had served on the NOAA survey ship, the DAVIDSON, as field operations officer? A Yes. Q And field operations officer, is the responsibility of that officer to direct the hydrographic survey operations? A Correct. Q All right. And then earlier in your career, you also served on board the NOAA survey vessels the RUDE and the HECK, correct? A Correct. Q All right. One of the missions assigned to NOAA by Congress is the publication of

nautical charts; is that right? A Yes. Q And it is within NOAA, it's the Office of Coast Survey, which is responsible for the publication of nautical charts; is that right? A Correct, for U.S. waters. Q Okay. And Federal Regulations require that deep water vessels, such as the ATHOS, have on board copies of either the NOAA nautical chart or the British Admiralty equivalent; is that correct? A Correct. Q All right. And as the former director of the Office of Coast Survey, did you understand that mariners rely on the information which is included on NOAA's nautical charts? A Correct, in addition to other information. Q Some of which was also published by NOAA, such as the Coast Pilot? A Yes, the Coast Pilot, and also information from the pilots and Local Notice to Mariners. Q All right. In preparing its charts, does NOAA use hydrographic survey data from its own survey vessels? A Yes. Q If that is available, correct? A We use it from our survey vessels, we use it from our contract data providers, we use it from the Army Corps of Engineers, we get it from private entities, we get it from port authorities, terminal managers, it can be almost any source. Q And you had indicated the Army Corps of Engineers. Do they make a general practice, when they do a hydrographic survey, that they send the results of those surveys to NOAA? A Correct. Q All right. NOAA's nautical charts provide the mariner with a variety of information, including the depths in the -- in the rivers, correct? A Correct. Q Also the location of the aids to navigation? A Correct. Q And does NOAA's charts also provide information on the location and the depth of obstructions to navigation? A Correct, the ones we know about.")

<sup>446</sup> Trial Tr. Day 24, November 9, 2010, Barnum, at 51:16-24 ("Q Has NOAA ever surveyed the areas around a terminal at a terminal owner's request? A Yes. Q Can you give me some examples of when NOAA surveyed at the request of a terminal owner? A In Portland, Maine, there's a very large crude facility that we survey, the liquified natural gas facility in Maryland, another liquified natural gas facility in Lake Charles, Louisiana, and I believe a facility in California.")

<sup>447</sup> Trial Tr. Day 24, November 9, 2010, Barnum, at 54:5-23 ("Q And if Citgo had told you that they conducted a survey of their approach, and had discovered an anchor that they felt was an obstruction, was that something that you would -- information that you would consider and put on a chart as an obstruction? A Absolutely. Q And if they had shared that information with Mr. Danley, who I think you mentioned was the NOAA representative at the MAC meetings in Philadelphia, would he have passed that information along for purposes of charting? A Absolutely. Q And if Citgo had advised you that they had discovered an anchor in the approach that was an obstruction, would you have put it in your Automated Wreck and Obstruction Information System? A I don't know if it would have triggered that, but, yes, it ultimately would have ended up there, yes -- Q Okay. A -- during the process.")

<sup>448</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 98:15-100:5 ("Q What is your mission with respect to obstructions in the Delaware River project? A When the corp is notified of an object or an obstruction, by an outside party, at that point, we mobilize our survey crews and attempt to travel to the location and report it to us and determine if the object or obstruction is a hazard to navigation. THE COURT: And if it is, do you remove it? THE WITNESS: If it is a hazard to navigation and we aren't able to determine who the owner of that object or the cause of that is, we get together with the Coast Guard and determine a joint -- in a joint decision, that it is a hazard and we'll move to contract that work and remove the object. Q You mentioned that you get together with the Coast Guard to determine whether or not it is, in fact, a hazard to navigation. What factors do you use to make that decision? A The first thing we do is to determine whether it's within the federal project boundaries. If it is within the federal project boundaries, we then make a determination whether or not the object is sticking up above the authorized project depth of the particular project. If that is the case and the area is being used frequently by the maritime industry, we will then, with the Coast Guard, jointly determine that it is a hazard to navigation. And if that's the case, the first thing we'll do is mark the object with a buoy and send a diver down to try and determine who the owner of that object is, if possible. At that point, if we haven't ascertained who the owner is, we will do a contracting action and we'll get somebody out there to remove the object. Q Do you notify anyone that there's an obstruction to navigation, once you've made that determination? A We'll notify the Coast Guard, but they're normally in on the whole action. But we will notify the Coast Guard and we will tend to give the pilots a call, also. Q Why do you notify the Coast Guard? A They're responsible for broadcasting the notice to mariners, that would warn the maritime community of the hazard. Q And was this your practice in 2004? A Yes.")

<sup>449</sup> Trial Tr. Day 3, September 22, 2010, Adams, at 63:10-64:15 ("Q Captain, did you serve in the United States Coast Guard? A Yes, I did. Q And when did you enter the Coast Guard? A 1969. Q And are you retired now? A I am. Q And when did you retire, sir? A 2002. Q And what was your rank when you retired? A Captain. Q And what was your last posting in the Coast Guard? A I was Commanding Officer of Marine Safety Office

Group, Philadelphia. Q Is that what is known as the Captain of the Port? A It is. Q All right. And were you the highest ranking Coast Guard official within the -- what is it called? -- MSO Group Philadelphia Zone? A Yes, I was. Q All right. And, Captain, in that -- in your capacity as Captain of the Port, were you a member of the Mariners Advisory Committee? A Yes, I was. Q All right. And when did you assume that membership? A When I assumed command of the Port of Philadelphia in July -- June or July of 1998. Q All right. Do you remain a member today? A I do, sir. THE COURT: Excuse me a moment. How do you occupy your time now that you're retired? THE WITNESS: I'm a maritime consultant, your Honor.")

<sup>450</sup> Trial Tr. Day 3, September 22, 2010, Adams, at 101:21-102:16 ("Q And did the MAC rely on the Corps of Engineers and NOAA and the United States Coast Guard to identify and remove obstructions to navigation -- identify or remove obstructions to navigation? A I wouldn't say identify as I would say that the MAC looked to those entities as obstructions were identified, as you put up with the Marcus Hook situation with the pinnacles of rock and the rock cut there, then the MAC would look to the Corps of Engineers and NOAA and the Coast Guard to address those obstructions. The MAC did not look to the Corps to conduct continuous surveys or -- other than their normal dredging and annual dredging program. Q But the MAC did rely on NOAA and/or the Army Corps to do surveys with which to place charted depths on navigation charts, am I correct in that? A Yes, as does the American public, that's part of their Federal responsibility is to maintain those, yes. Q And also on those navigation charts to, if known, mark obstructions to navigation? A Yes, if known, then they can mark obstructions to navigation, yes.")

<sup>451</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 52:24-53:4 ("Q Okay. Did the draft standards say anything about searching for obstructions? A No. Q Did they say anything about surveying the anchorage? A Absolutely not. The anchorage is the responsibility of the Corps of Engineers, not us.

<sup>452</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 54:5-24 ("MR. WALKER: Let's look at Exhibit 1918, please. BY MR. WALKER: Q What does the red area show, the red triangle? A The red area is the permitted dredge area for the ship dock, Number 1 Dock. Q And the green area? A The green area is the Federal Anchorage Number 9, the Mantua Creek Anchorage. Q Okay. In your experience on your 19 years on the river at the time of starting your employment with CITGO and since then, who maintains surveys and has control over this green area? A The Corps of Engineers. Q And is the red area where you conducted -- or instructed Hudson to conduct the hydrographic surveys? A That's the area they would survey, yes, for CITGO, for CARCO. Q Were you interested in any soundings beyond the permitted area? A No.")

<sup>453</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 87:15-19 ("Q You may answer. A Well, the only answer I can give you is in reference to the berth, I cannot talk to the approaches. We had nothing to do with the approaches, the approaches are the Army Corps of Engineers.")

<sup>454</sup> Rankine Dep. dated October 16, 2007, at 77:23-25 ("A. I had no responsibility for the approaches to the berth. My responsibility is at the berth.")

<sup>455</sup> Rankine Dep. dated October 16, 2007, at 82:17-84:2 ("Mr. Rankine, you referred to an area of responsibility for dredging and then a berth area; is that correct? A. Yes, sir. Q. Okay. So you're distinguishing those two areas? A. Yes. Q. Okay. And is the berth area what you described earlier as the footprint where the vessel, a typical vessel would moor to the pier of Dock No. 1 in Paulsboro, New Jersey? A. Yes. Q. And there's an area beyond that farther away from the pier that you understood in 2004 that CITGO might have some responsibility for dredging. MR. LEBLANC: Object to the form of the question. MR. LEVY: You may answer. THE WITNESS: Yes. BY MR. LEVY: Q. And -- and we were not outlining right now in front of you what that area is, but essentially, I'm just trying to describe the different areas. We've got the -- the footprint area directly in front of the pier -- A. Yes. Q. -- right? And then you've got an area beyond that that has some boundaries that we haven't described yet that you believe CITGO had some responsibility for dredging that area? A. Yes.

<sup>456</sup> Rankine Dep. dated October 16, 2007, at 173:16-22 ("Q. And that was the policy in 2004? A. We -- we are not permitted to survey federal waterways, those are federal waterways, we're not allowed to survey federal waterways, the Army Corps of Engineers surveys federal waterways. We cannot willingly go out and survey federal waterways.")

<sup>457</sup> Trial Tr. Day 10, October 6, 2010, Drager, at 60:24-61:10 ("Q Could you point to the area that was dredged, that is the dredged area, the area that Citgo was responsible for dredging? A You see this triangular area or something that's a triangular area right here, that is the area of CARCO's responsibility, Citgo's responsibility, that was dredged. It does not include anything beyond this line of demarcation between our area of responsibility and the Mantua anchorage or the Federal anchorage. Q In fact it specifically states, does it not, Mantua Creek Anchorage Line? A Yes, right here it states, Mantua Creek Anchorage Line.")

<sup>458</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 90:18-91:7 ("Q Mr. DePasquale, who do you work for? A I work for the U.S. Army Corp of Engineers in Philadelphia. Q And what's your position with the Army Corp? A I'm the Chief of Operations Division. Q Are hydrographic surveys part of your division? A Yes. Q How long have you been Chief of Operations? A Approximately, two years. Q At the time of the Athos oil spill, what position did you hold with the Army Corp? A I was the Chief of Technical Support Branch. Q And were hydrographic surveys also part of the technical support branch? A Yes.")

<sup>459</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 104:16-105:13 ("Q Would a private company need any kind of permit from the Corp of Engineers to do a hydrographic survey in the federal area? A No. Q Can you give me an example of any organizations or facilities that have done hydrographic surveying within the bounds of the Delaware River project? MR. O'DONOVAN: Objection, your Honor, it calls for hearsay. THE COURT: No, it doesn't. BY MS. SHUTLER: Q You can answer. A Well, first, I know that NOAA always overlaps our surveys in the channel. Second of all, facilities often do their own surveying. Conoco Phillips, at this time, on an annual basis, is surveying their berthing area and they are requesting to use Corp of Engineers disposal areas for dredge material disposal. So, they're providing us with their survey, along with the survey of the federal channel in front of their berthing areas. It's not the whole channel that they're surveying, but they're surveying their berthing areas and then they're overlapping and surveying the federal channel and kind of indicating that both areas need dredging.")

<sup>460</sup> Trial Tr. Day 28, November 17, 2010, Long, at 66:14-67:16 ("Q Mr. Long, by whom are you presently employed? A I'm employed by S.T. Hudson Engineers, Incorporated. THE COURT: Get close to the microphone, please. You can pull it back towards you if you want. (Pause.) BY MR. WALKER: Q And could you repeat your answer. A I'm employed by S.T. Hudson Engineers, Incorporated. Q All right. And what kind of company is that? A A consulting engineering firm. Q And what kind of business is it in? What kind of jobs do you do? A We are a marine consulting engineering firm, so we are involved with designing and repairing marine structures, all the federal and state permits that would go along with that, we have underwater inspection teams, hydrographic survey teams that compliment the type of work that we do on marine structures. Q Okay. And with respect to this case that you're here to testify about, your involvement was hydrographic surveys? A That is correct, sir. Q Okay. How long have you been employed at S.T. Hudson or its predecessors? A For 37 years. Q What's your position today? A Vice President and Chief Operating Officer. Q And how long have you been in that position? A Approximately 13 years.")

<sup>461</sup> Trial Tr. Day 28, November 17, 2010, Long, at 124:15-20 ("Q Okay. That is in the Federal Anchorage; is it not? A That is correct. Q Did you need a permit from any federal or state agency, an order for your survey equipment to go into that area and obtain the data that's set forth on that chart? A No, we did not.")

<sup>462</sup> Trial Tr. Day 6, September 29, 2010, Capone, 116:9-22 ("Q Mr. Capone, what do you do for a living? A I'm a hydrographer and an expert in marine search and survey, also an expert in marine technologies. Q What is a hydrographer? THE COURT: Somebody who draws pictures of water, I would assume. (Laughter.) THE WITNESS: Yes, sir, using electronics. A hydrographer is a person who utilizes various technologies to map the seabed or the riverbed. BY MR. LEVY: Q And do you also measure the depth of waters? A Yes, that is part of a hydrographer's standard occupation or standard operation.")

<sup>463</sup> Trial Tr. Day 6, September 29, 2010, Capone, 141:10-15 ("Q By the way, in your work with terminals, and with other companies along the Delaware River, did you ever need to obtain any kind of permit from the Army Corps of Engineers, or anyone else, in order to search into an anchorage, or into a federal channel, using side scan sonar? A There's no permitting required to do the survey.")

<sup>464</sup> Trial Tr. Day 24, November 9, 2010, Barnum, at 53:18-54:4 ("Q Now, in 1999, if Citgo had asked NOAA to search for obstructions in the Mantua Creek Anchorage, would you have done so? A We would have considered it, yes. Q If they had told you in 1999, that they were planning to bring in deep draft single-hull tankers through the anchorage at low water, and had asked you to search for debris, would you have considered that request? A That



would increase the priority. *Q* And would you have actually undertaken such a Citgo -- or such a -- such a survey at a terminal operator's request? *A* Yes.")

<sup>465</sup> *Kamat Dep. dated February 29, 2008, at 120:14-121:6 ("Q. When you were the port captain of the Paulsboro Terminal and you saw companies doing hydrographic surveys, did you think that they were surveying the river for anything other than the depth of the water? A. I didn't think anything. It's not my business. Q. Well, let me ask you a more specific question then. A. Okay. Q. When you saw companies doing hydrographic surveys in the Delaware River off the dock at the Paulsboro facility, did you think that they were surveying the river for obstructions or debris? A. I didn't think that they were looking for obstructions and debris.")*

<sup>466</sup> *Trial Tr. Day 30, November 22, 2010, Rankine, at 88:10-14 ("Q In November of 2004, did you have any knowledge or experience as to what the Army Corps of Engineers was doing to check the Federal anchorage for obstructions and debris? A Not my area of responsibility, so I didn't pay any attention to what they were doing.")*

<sup>467</sup> *Trial Tr. Day 30, November 22, 2010, Rankine, at 89:16-90:1 ("Q Was there anyone in the Marine Technical Department in 2004 who had knowledge or information about the surveying techniques that the Army Corps was using out in the Mantua Creek Anchorage? A There was no one in the Marine Technical Services Division that would pay any attention to that because it was not our area of responsibility. THE COURT: So, you don't know whether they had information about it, but at least they didn't pay any attention to it, right? THE WITNESS: That's it, Judge, yes.")*

<sup>468</sup> *Rankine Dep. dated October 16, 2007, at 246:24-247:3 ("Q. Did you have any understanding in 2004 as to what types of surveys the Army Corps of Engineer was do -- Army Corps of Engineers was doing for the Mantua Creek anchorage? A. No.")*

<sup>469</sup> *Rankine Dep. dated October 16, 2007, at 246:24-247:3<sup>469</sup>, 251:4-8 ("Q. Before the ATHOS 1 incident, did you have any knowledge as to what the Army Corps of Engineers was doing to check the Mantua Creek anchorage for obstructions? A. No.")*

<sup>470</sup> *Trial Tr. Day 30, November 22, 2010, Rankine, at 88:10-14 ("Q In November of 2004, did you have any knowledge or experience as to what the Army Corps of Engineers was doing to check the Federal anchorage for obstructions and debris? A Not my area of responsibility, so I didn't pay any attention to what they were doing.")*

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<sup>472</sup> *Trial Tr. Day 3, September 23, 2010, Adams, at 63:20-64:12 ("Q And what was your last posting in the Coast Guard? A I was Commanding Officer of Marine Safety Office Group, Philadelphia. Q Is that what is known as the Captain of the Port? A It is. Q All right. And were you the highest ranking Coast Guard official within the -- what is it called? -- MSO Group Philadelphia Zone? A Yes, I was. Q All right. And, Captain, in that -- in your capacity as Captain of the Port, were you a member of the Mariners Advisory Committee? A Yes, I was. Q All right. And when did you assume that membership? A When I assumed command of the Port of Philadelphia in July -- June or July of 1998. Q All right. Do you remain a member today? A I do, sir.")*

<sup>473</sup> *Trial Tr. Day 3, September 23, 2010, Adams, at 67:11-70:8 ("Q Captain, was your participation with the MAC related to your function as Captain of the Port? A Yes, it was. Q All right. And let's talk a bit about -- let me withdraw that. Is the purpose of the MAC -- is the MAC concerned with the safety of navigation? A Primarily, yes. Q Safe navigation of large vessels? A Yes. Q And is it explicitly charged with making recommendations for safe drafts? A Yes, it is. Q All right. Now, does it make those recommendations to the Corps of Engineers? A It does. Q The Coast Guard? A Yes. Q The National Oceanographic and Atmospheric Administration? A Yes. Q Local bridge authorities? A Yes. Q Channel users? A Yes. Q What in the MAC parlance are channel users? A Channel users would be the deep-draft traffic, as well as other tug and towing operations, in commercial traffic predominantly. Q Now, were you -- was there a formal introduction, were you formally introduced to the MAC? A Yes, I was. Q And who made that introduction? A During the command relief process, my predecessor, Captain John Ventjer, in his capacity as the ex officio member of the MAC, brought me to the MAC meeting and introduced me as the relieving*

Captain of the Port. Q All right. And does the Captain of the Port traditionally sit as a member of the MAC? A Yes. Q And Captain Ventjer had done so? A Yes. Q All right. Now, in short then, Captain, was the MAC, by virtue of its membership, a vehicle to assist you in carrying out your responsibilities for safe navigation? A Yes, it was. Q And were these transit advisories one of the vehicles utilized in that function? A Yes. Q All right. Now, would you tell us by category what the membership of the MAC consists of? A Yes. The MAC was convened and initially started by the Pilot's Association in 1964 and its charter was twofold, two interests was to direct its efforts at the navigation safety of large oceangoing ships upon the Delaware River and, secondly, to have its membership comprised of professional mariners within the region, as well as Coast Guard Corps of Engineers. Q And does membership in the shipping community you mentioned include the local shipping operators? A It does. Q And terminal operators? A Yes, it does. Q Now, during your tenure as Captain of the Port, did the Coast Guard initiate a program to encourage the nationwide formation of harbor safety committees? A Yes, they did. Q And was the MAC utilized in that effort in any way? A Yes. As I assumed command in 1998, the Coast Guard, in response to the Oil Pollution Act of 1990, was working to develop national -- national harbor safety committees in all the U.S. ports and the MAC that had been in existence since 1964 was used as a model to follow in that process.")

<sup>474</sup> Trial Tr. Day 3, September 23, 2010, Adams, at 101:21-103:3 ("Q And did the MAC rely on the Corps of Engineers and NOAA and the United States Coast Guard to identify and remove obstructions to navigation -- identify or remove obstructions to navigation? A I wouldn't say identify as I would say that the MAC looked to those entities as obstructions were identified, as you put up with the Marcus Hook situation with the pinnacles of rock and the rock cut there, then the MAC would look to the Corps of Engineers and NOAA and the Coast Guard to address those obstructions. The MAC did not look to the Corps to conduct continuous surveys or -- other than their normal dredging and annual dredging program. Q But the MAC did rely on NOAA and/or the Army Corps to do surveys with which to place charted depths on navigation charts, am I correct in that? A Yes, as does the American public, that's part of their Federal responsibility is to maintain those, yes. Q And also on those navigation charts to, if known, mark obstructions to navigation? A Yes, if known, then they can mark obstructions to navigation, yes. MR. WHELAN: That's all I have, your Honor. REDIRECT EXAMINATION BY MR. KUFFLER: Q Captain, in your time as a member of the Mariners Advisory Committee, was it your understanding that the Army Corps of Engineers as a matter of course was not looking at the Federal waterways, channels, anchorages for obstructions? MR. WHELAN: Objection, leading. THE COURT: Objection overruled. THE WITNESS: Yes. The major involvement of the Corps was involved in dredging operations, not -- it was not dealing with surveys and soundings and foreign objects.")

<sup>475</sup> Trial Tr. Day 3, September 23, 2010, Adams, at 67:16-68:14 ("Is the purpose of the MAC -- is the MAC concerned with the safety of navigation? A Primarily, yes. Q Safe navigation of large vessels? A Yes. Q And is it explicitly charged with making recommendations for safe drafts? A Yes, it is. Q All right. Now, does it make those recommendations to the Corps of Engineers? A It does. Q The Coast Guard? A Yes. Q The National Oceanographic and Atmospheric Administration? A Yes. Q Local bridge authorities? A Yes. Q Channel users? A Yes. Q What in the MAC parlance are channel users? A Channel users would be the deep-draft traffic, as well as other tug and towing operations, in commercial traffic predominantly.")

<sup>476</sup> Trial Tr. Day 3, September 23, 2010, Adams, at 69:10-70:3 ("10 Q All right. Now, would you tell us by category what the membership of the MAC consists of? A Yes. The MAC was convened and initially started by the Pilot's Association in 1964 and its charter was twofold, two interests was to direct its efforts at the navigation safety of large oceangoing ships upon the Delaware River and, secondly, to have its membership comprised of professional mariners within the region, as well as Coast Guard Corps of Engineers. Q And does membership in the shipping community you mentioned include the local shipping operators? A It does. Q And terminal operators? A Yes, it does. Q Now, during your tenure as Captain of the Port, did the Coast Guard initiate a program to encourage the nationwide formation of harbor safety committees? A Yes, they did. Q And was the MAC utilized in that effort in any way?")

<sup>477</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 106:24-107:14 (Q Are you familiar with the Mariners Advisory Committee, also known as the MAC? A Yes. Q Does the corp attend the quarterly MAC meetings? A Yes, we do. Q Have you personally attended quarterly MAC meetings on behalf of the corp? A Yes, I have. Q Who else typically attends those MAC meetings? A Well, they're attended by the Corp of Engineers, the Coast Guard and NOAA. And then there's a lot of -- a lot of other personnel from the pilots, the tug companies, ship owners, ship agents, facilities, different fuel terminals and refineries. Sometimes, the Navy is there, but rarely. But there's, you know, the whole maritime industry shows up, pretty much, at these meetings.



<sup>478</sup> Trial Tr. Day 30, November 22, 2010, Rankine, at 96:18-20 ("Q Now, you sat on the Mariners Advisory Committee on behalf of CITGO in 2004, didn't you? A I attended the meetings, yes.")

<sup>479</sup> Rankine Dep. dated October 16, 2007, at 206:14-207:13 ("Q. And did you serve on the Mariners' Advisory Committee? A. I was a member of it, yes. Q. When were you a member? A. Oh, I started when the -- when they asked for the renewal of our dues, which would have been in 2002 and I -- I was in it until the current port captain took over that position when he -- he took the -- the job, which would have been 2006. I was the representative. Q. And who was the member, was it CITGO Petroleum, was it CITGO Asphalt Refining Company? A. It would be CITGO Petroleum because I -- I -- I paid the -- no, I beg your pardon, it would be CITGO Asphalt because the money came from CITGO Asphalt. Q. So in 2004, CITGO Asphalt was a member of the Mariners' Advisory Committee? A. Yes. Q. And you were the designated representative to attend those meetings? A. That's correct. Q. And how often did the Mariners' Advisory Committee meet? A. Roughly, quarterly.")

<sup>480</sup> Kamat Dep. dated February 29, 2008, at 196:10-18 ("Q. Okay. When you were the port captain at the Paulsboro facility, were you familiar with the mariner's advisory committee for the Bay and River Delaware? A. I was familiar with it, yes, when I was working there. Q. Did you attend the mariner's advisory committee meetings? A. Sometimes.")

<sup>481</sup> Kamat Dep. dated February 29, 2008, at 197:9-19 ("What role, if any, did you play on the mariner's advisory committee as a CITGO representative? A. Basically a listener. If there is something -- Q. All right. A. Basically as a listener. And if there is something that they're saying that is going to affect the traffic of CITGO's shipments, then I would bring it to the attention of the terminal.")

<sup>482</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 108:14-23 ("14 Q Is there an opportunity for dialogue between the corp and users of the river at the MAC, regarding dredging and any other need, for that matter? A Yes, after our presentation, typically, there's a question and answer period. And then we're at the meeting for two to three hours, so, during that period, there is the opportunity for us to discuss dredging and issues on the Delaware River, with whoever wants to talk to us. Q Was this true in 2004? A Yes.")

<sup>483</sup> Trial Tr. Day 24, November 9, 2010, Barnum, at 47:10-16 ("Q Is NOAA able to address all of its survey priorities in any given year? A No. Again, we only survey about 3,000 square nautical miles a year, and I've mentioned we have 3.4 million square nautical miles of which 500,000 is significant, navigationally significant, so at that rate it's about 160 years before we can even get to that.")

<sup>484</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 92:9-93:2 ("9 It is not uncommon for observed low tides to be less than MLLW on the Delaware River? A Yes, as indicated, the very definition -- Q Right. A -- implies that mean lower low water is an average of the low water, so by definition roughly half of the tides that are occur are lower than that for the lower tides, and half of them are above. Q Right. The MLLW is a 19-year average? A That's correct. Q And, so, as you say by definition, it's a mean, and, therefore, half of the low water -- A Roughly half. Q -- roughly half of the low waters are going to be above it and half are going to be below it. In fact, low tides that are 1 foot below MLLW are not uncommon on the Delaware River; isn't that correct? A I wouldn't know about how common they are, but I would assume they do occur, yes, sir.")

<sup>485</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 96:3-9 ("Q Well, let's take a look at Marcus Hook for 2004, and see if you disagree with me. MR. LEVY: Could we pull up the Marcus Hook data, please? BY MR. LEVY: Q I'm just going to show you a couple of the months in 2004 for Marcus Hook.")

<sup>486</sup> Trial Tr. Day 6, November 29, 2010, Capone, at 118:15-19 ("Q Was there anything unusual about the tide on November 26th, 2004? A Yes -- I'm sorry -- no, there was not. Q Was the tide running significantly below MLLW? A No, it was not.")

<sup>487</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23 ("Q Okay. During your trip up the river, did you have occasion to check for the actual tide? A Yes, I did. Q How do you do that? A Just visual cues that have been experienced by me and every other pilot, for years. Q Can you give us a couple of examples of where you might look if you wanted to check to see how the actual tide was running? A I can tell you the ones I used on this particular ship. Q Please do. A I started at -- I noticed when we went by Buoy Marker 42 on Liston (ph) range. Q Am I pointing to that circle of the area where Buoy 42 is? A Yes. Q Any others? A I noticed Reedy Island bar or

Reedy Island range. *Q* Am I pointing to the place on the chart where Reedy Island bar is? *A* That is correct. *Q* Okay. Anything else? *A* And then just above Finn's Point, there's a bulkhead bar around Buoy 2-B or 2-D on deep water. *Q* Is that a fixed navigational marker or float? *A* Which one? *Q* At Finn's Point. *A* That would be a shoal. *Q* Okay. And how about down on 42? *A* 42 is a fixed marker. *THE COURT*: What is the significance of these markers? You said you saw something, how did you see it? *THE WITNESS*: Just the height of the water as they appear on the marker. *Q* Did what you observed regarding the height of water give you any cause for concern? *A* No. *Q* Now, during the course of your trip up the river -- *THE COURT*: In your parlance, is the height of the water, under those circumstances, the same thing as the depth of the water for everybody else? *THE WITNESS*: No, sir, that would just be the range that I would observe between normal high and normal low on a fixed structure. Which I've noticed for 40-some years. *THE COURT*: And what conclusion would you reach? *THE WITNESS*: That is was just a normal falling tide. *THE COURT*: And it was enough (inaudible)? *THE WITNESS*: Yes.")

<sup>488</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 59:8-11 ("Q On your direct testimony, you mentioned that you checked the actual tidal height by visual cues going up river, is that correct? *A* Yes, and the ship's pentameter (ph).")

<sup>489</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-17 ("Q On the night of the 26th did you observe what the tide was actually doing that night? *A* Yes, I did. When I boarded the tugboat, the SURREY MORAN, from the Naval Base I looked at the jetties, the buoys. I also looked at -- *THE COURT*: Well, excuse me. The buoys wouldn't tell you the depth of the water, would they? *THE WITNESS*: No, they would give you the current if you look for a tail on either side of them. I also looked at the shoal above Tinicum Island to see if there was a greater exposure than normal. Sometimes if the wind blows for three, four days out of the northwest you'll see much more of the shoal pronounced than what was that night which was about the same as normal for low water right there at the upper end.")

<sup>490</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 9:5-20 ("Q Okay. Now you mentioned that you look at the shoal on Tinicum Island, is that what we've marked as No. 3? *A* That's correct. *Q* Were you able to see that? *A* Yes. *Q* How was visibility that night? *A* Excellent. *Q* Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? *A* No. *Q* Did it appear normal to you? *A* Approximately. *Q* Okay. So did the actual tide give you any concern about the upcoming maneuver that you planned to take? *A* No.")

<sup>491</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 64:22-65:9 ("Q Okay. When you boarded the ATHOS in Billingsport Range you assumed, based on your experience, that the actual height of tide would be one foot lower than predicted because of a full moon, right? *A* I estimated it could be off as much as a foot. *Q* Is that what you assume when you formulated your plan to dock the ATHOS? *A* That's the plan I formulated when I was thinking of the times when I got the call at home and looked at my tide booklet that it was going to be a full moon. But when I reached Navy Yard, you know, I checked the piers, I looked at Tinicum Island's, you know, upper shoal. It didn't seem to be off as much as I thought.")

<sup>492</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 68:1-6 ("Q And after the incident you also learned that the actual height of tide measured by the tide gauges in the river showed that the height was in fact one foot less than predicted, just as you had assumed based on your experience, correct? *A* I don't think it was.")

<sup>493</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 47:1-10 ("Q So if a ship was planning an inbound voyage in the Delaware River, could the navigators on the ship calculate the predicted height of tide and depth of water at various locations in advance of that voyage? *A* Yes, tide predictions are available years in advance. So you can -- by knowing where you plan to be at a specific time, you can look at a chart, see what the charted depth is, and then predict the tide for that occurrence. Knowing what your draft is, you can then predict what your predicted under keel clearance would be at that time.")

<sup>494</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 46:22-25 ("Q Did you check a NOAA website in addition to looking at this book for the tides before you left for your job on the ATHOS? *A* I believe I did.")

<sup>495</sup> Trial Tr. Day 2, September 22, 2010, Teal, Day 2, at 70:11-17 ("Q What else did you ask him? *A* I told him that I had ascertained the tide predictions and the state of the current and the state of the tide, at the moment and with his draft, that the squat of the ship should be negligible and that I anticipated about a one and a half to three meters for the entire trip and possibly more. *Q* Okay, could we look at that pilot card?")

<sup>496</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 86:12-16 (“Q Okay and let me ask you, you had a radio telephone available to you on the transit up river, did you not? A FM set, yes. Q And you also had a cellphone available to you? A I had one, yes.”)

<sup>497</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 70:17-21 (“Q Did you make any attempt, while going up river, to check the actual tide at Marcus Hook range, in accordance with the tidal gauge there? A It was my understanding before I even got aboard the ship, that it was either inoperative or inaccurate.”)

<sup>498</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 17:5-11 (“Q Okay. How long have you been a river pilot? A 39 years. Q Did you have to undergo any kind of training before you became a river pilot? A Comprehensive and extensive training. Q Did you serve an apprenticeship? A Five years.”)

<sup>499</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 18:8-10 (“Q Can you estimate for us how many times you’ve been up and down the Delaware River as a pilot in your 39 year career? A Several thousand.”)

<sup>500</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 30:19-23 (“THE COURT: And what conclusion would you reach? THE WITNESS: That is was just a normal falling tide. THE COURT: And it was enough (inaudible)? THE WITNESS: Yes”).

<sup>501</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 74:5 -9 (“Q Okay. According to the voyage plan, the master thought he was sailing on a flood current to Paulsboro. As I understand your testimony, you knew you were sailing on a falling tide to Paulsboro, correct? A Correct.”)

<sup>502</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 76:13-20 (“Q So, the master did not know that your plan was to proceed to Paulsboro on a falling tide? MR. O’CONNOR: Objection, your Honor. THE COURT: Overruled. THE WITNESS: He knew very well that we weren’t going up on a flood current, at rising tide, because I explained it to him and I explained the under-keel clearance and he agreed and we went.”)

<sup>503</sup> Trial Tr. Day 15, October 18, 2010, Markoutsis, at 24:17-24 (“Q Now, Captain, when the River Pilot Teal boarded your vessel, it was your understanding at that time that your river passage would take an extra one and a half hours to complete, correct? A We don’t know exactly how much time will delay. The Pilot told me that we are going to have the current against us, so we have to -- we delay, we’re going to delay, but I don’t remember if he told me how much time.”)

<sup>504</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23 (“Q Okay. During your trip up the river, did you have occasion to check for the actual tide? A Yes, I did. Q How do you do that? A Just visual cues that have been experienced by me and every other pilot, for years. Q Can you give us a couple of examples of where you might look if you wanted to check to see how the actual tide was running? A I can tell you the ones I used on this particular ship. Q Please do. A I started at -- I noticed when we went by Buoy Marker 42 on Liston (ph) range. Q Am I pointing to that circle of the area where Buoy 42 is? A Yes. Q Any others? A I noticed Reedy Island bar or Reedy Island range. Q Am I pointing to the place on the chart where Reedy Island bar is? A That is correct. Q Okay. Anything else? A And then just above Finn’s Point, there’s a bulkhead bar around Buoy 2-B or 2-D on deep water. Q Is that a fixed navigational marker or float? A Which one? Q At Finn’s Point. A That would be a shoal. Q Okay. And how about down on 42? A 42 is a fixed marker. THE COURT: What is the significance of these markers? You said you saw something, how did you see it? THE WITNESS: Just the height of the water as they appear on the marker. Q Did what you observed regarding the height of water give you any cause for concern? A No. Q Now, during the course of your trip up the river -- THE COURT: In your parlance, is the height of the water, under those circumstances, the same thing as the depth of the water for everybody else? THE WITNESS: No, sir, that would just be the range that I would observe between normal high and normal low on a fixed structure. Which I’ve noticed for 40-some years. THE COURT: And what conclusion would you reach? THE WITNESS: That is was just a normal falling tide. THE COURT: And it was enough (inaudible)? THE WITNESS: Yes.”)

<sup>505</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 59:8-11 (Q On your direct testimony, you mentioned that you checked the actual tidal height by visual cues going up river, is that correct? A Yes, and the ship’s pentameter (ph).”)

<sup>506</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 37:20-21 ("Q And it took about eight hours to get up to Paulsboro? A A little longer.")

<sup>507</sup> Trial Tr. Day 11, October 7, 2010, Carroll, at 76:23-77:1 ("Q And it's correct that the sailing time from the Pilot's Station to berth is about nine hours? A It's about seven hours; however, if you're stemming the tide, it could take longer.")

<sup>508</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 87:6-88:2 ("Q Okay. Now, you would agree with me that it's not uncommon for observed tides on the Delaware River to be higher or lower than predicted tides? A I would agree with that. Q In fact, it's fairly common for observed tides to be different from that which is predicted by NOAA in its tide tables for the same location at the same time? A That's correct. Q Observed tides can vary considerably from predicted times and height, and still be within a range of what is expected or normal? A Could you repeat that? I'm not sure what your question is. Q Observed tides can vary considerably from predicted in height and still be within a range of what is expected? A I'm not sure what you mean "what is expected"? Q All right. On the Delaware River, if the predicted height of tide for a particular location at a particular time was .5 feet above MLLW, and the actual tide was .3 feet above, or .3 feet below that predicted height, that would be a fairly common event, wouldn't it? A It would be a common event, yes.")

<sup>509</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 91:1-12<sup>509</sup> Q This table shows, does it not, Dr. Cole, that for 2 Philadelphia, 90 percent of the observed tides will be within 3 1 foot of predicted low water? Sorry. Let me rephrase the question. This table shows that at Philadelphia, 90 percent of the observed low tides will be within 1 foot of the predicted low water? A It does appear to show that, yes, sir. Q And it shows that at Reedy Point -- and I'm pointing here on the -- that 90 percent of the observed low tides will be within .9 feet of predicted low water? A Yes, sir.")

<sup>510</sup> Trial Tr. Day 21, November 3, 2010, Cole, at, 91:25-97:2 ("Q So it's not uncommon for observed tides to be lower than MLLW on the Delaware River; isn't that also true? A That was my testimony -- MR. LEVY: We can take that down, please. THE WITNESS: -- but there can be variations between actual tides and predicted tides. BY MR. LEVY: Q No. My question is a little different. I'm sorry. I changes pages on you without telling you. It is not uncommon for observed low tides to be less than MLLW on the Delaware River? A Yes, as indicated, the very definition -- Q Right A -- implies that mean lower low water is an average of the low water, so by definition roughly half of the tides that are occur are lower than that for the lower tides, and half of them are above. Q Right. The MLLW is a 19-year average? A That's correct. Q And, so, as you say by definition, it's a mean, and, therefore, half of the low water -- A Roughly half. Q -- roughly half of the low waters are going to be above it and half are going to be below it. In fact, low tides that are 1 foot below MLLW are not uncommon on the Delaware River; isn't that correct? A I wouldn't know about how common they are, but I would assume they do occur, yes, sir. Q Well, let's take a look at Marcus Hook for 2004, and see if you disagree with me. MR. LEVY: Could we pull up the Marcus Hook data, please? BY MR. LEVY: Q I'm just going to show you a couple of the months in 2004 for Marcus Hook. (Pause.) MR. LEVY: Okay. We're going to have to pull that in much closer so we can see. MR. DeGIULIO: Does this have a Plaintiffs' exhibit number? MR. LEVY: If it doesn't, it will get one in a minute. MR. DeGIULIO: Have we ever seen this one? MR. LEVY: This is the published data. It's on the website for tides and currents. MR. DeGIULIO: Okay. BY MR. WHELAN: Q This is tides and currents. This is NOAA's website for published data, and this is, in particular, for 2004 in the Marcus Hook range. And what I've highlighted here throughout this is the times on November 26th, 2004 -- I'm sorry -- I'm sorry -- this is for the month of January in 2004, where the low tides are below MLLW. So do you see that entry there for -- A Are these predicted or is that observed tides? Q These are observed. MR. LEVY: Could we go back to the first page, and could we pull up the historic data section there? (Pause.) BY MR. LEVY: Q Okay. A Okay. Q Do you see these are verified tides? A Right. Q Okay. MR. LEVY: Now, take that off, please? (Pause.) BY MR. LEVY: Q Now, I'll represent to you, if we counted these together -- A Mm-hmm. Q -- you would find 23 low tides in 2004, in January at the Marcus Hook Range that were below MLLW? A I wouldn't be surprised. During those times, you know, you do have veer-offs and prevailing northerly winds that would create such a situation. Q And if we went to February of 2004, and I can pull that data up if you'd like, we'd find 31 low tides that were below MLLW. Would you be surprised by that information? A No. Q And, in fact, if we did the whole year looking at Marcus Hook, we find 174 low tides that were below MLLW for the Marcus Hook range? A Very good. Q If we -- MR. LEVY: Oh, I'm sorry. You need to pull that one back up again. I'm looking for the lowest of the low tides in this group. Could we pull up just the last entry down at the bottom of this page, please? (Pause.) BY MR. LEVY: Q Do you see the lowest of the low tides here for January of 2004, at Marcus Hook was 2.37 feet below MLLW? A Yes, I do. Q Now, do you see the entry above it where there's one entry where it was



1.39 feet below MLLW? A Yes, I do. Q And one there with 1.97 feet below MLLW? Do you see that? A Yes, I do. THE COURT: He has very good vision. It's amazing. BY MR. LEVY: Q So low tides that are 1 foot below MLLW are not uncommon on the Delaware River; is that correct? A I would think they are not uncommon. And that's precisely why it's important to compare predicted tides with real time tides to determine the correction, so that you can predict safe under keel clearances. Q Did you know before you testified today that the ship did not have access to the internet? A No, but two things; one, there was -- you can access that information via the phone, and also I would presume that the pilots had access. Q Did you know they had a pilot on board? A I've read that in the testimony that there was a pilot on board. Q And you're not a mariner, are you? A No, sir. Q Okay. You've never done passage planning? A Yes, I have. I was the navigator on the ship RANIER. Q Ah, okay. Have you ever done any passage planning for a vessel coming up the Delaware River? A No, sir, I have not. Q Have you ever been in the position of having to make the decision as to whether your vessel should go up the Delaware River on high tide, or low tide, or any tide in between? A I've never voyaged up the Delaware River.")

<sup>511</sup> Trial Tr. Day 6, September 29, 2010, Capone, at 118:15-19 ("Q Was there anything unusual about the tide on November 26th, 2004? A Yes -- I'm sorry -- no, there was not. Q Was the tide running significantly below MLLW? A No, it was not.")

<sup>512</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 37:25-39:23 ("Q Okay. During your trip up the river, did you have occasion to check for the actual tide? A Yes, I did. Q How do you do that? A Just visual cues that have been experienced by me and every other pilot, for years. Q Can you give us a couple of examples of where you might look if you wanted to check to see how the actual tide was running? A I can tell you the ones I used on this particular ship. Q Please do. A I started at -- I noticed when we went by Buoy Marker 42 on Liston (ph) range. Q Am I pointing to that circle of the area where Buoy 42 is? A Yes. Q Any others? A I noticed Reedy Island bar or Reedy Island range. Q Am I pointing to the place on the chart where Reedy Island bar is? A That is correct. Q Okay. Anything else? A And then just above Finn's Point, there's a bulkhead bar around Buoy 2-B or 2-D on deep water. Q Is that a fixed navigational marker or float? A Which one? Q At Finn's Point. A That would be a shoal. Q Okay. And how about down on 42? A 42 is a fixed marker. THE COURT: What is the significance of these markers? You said you saw something, how did you see it? THE WITNESS: Just the height of the water as they appear on the marker. Q Did what you observed regarding the height of water give you any cause for concern? A No. Q Now, during the course of your trip up the river -- THE COURT: In your parlance, is the height of the water, under those circumstances, the same thing as the depth of the water for everybody else? THE WITNESS: No, sir, that would just be the range that I would observe between normal high and normal low on a fixed structure. Which I've noticed for 40-some years. THE COURT: And what conclusion would you reach? THE WITNESS: That is was just a normal falling tide. THE COURT: And it was enough (inaudible)? THE WITNESS: Yes.")

<sup>513</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 8:9-17 ("THE COURT: Well, excuse me. The buoys wouldn't tell you the depth of the water, would they? THE WITNESS: No, they would give you the current if you look for a tail on either side of them. I also looked at the shoal above Tinicum Island to see if there was a greater exposure than normal. Sometimes if the wind blows for three, four days out of the northwest you'll see much more of the shoal pronounced than what was that night which was about the same as normal for low water right there at the upper end.")

<sup>514</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 9:12-20 ("Q Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? A No. Q Did it appear normal to you? A Approximately. Q Okay. So did the actual tide give you any concern about the upcoming maneuver that you planned to take? A No.")

<sup>515</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 67:20-68:7 ("Q Is it your -- did you make a determination whether or not to check the draft before boarding the ship? A It's almost impossible to do that. Q Why? A Because of the wave motion of the ship, the ship's moving through the water. There couldn't be an accurate determination, impossible. Q Was the ship moving slowly at that time, in order to safely board you? A Six to eight knots. Q And at that speed, you're saying that the wave action would obscure an accurate draft reading? A That's correct.")

<sup>516</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 73:3-23 ("Q Now, in your experience as a Pilot, when you board a vessel that's at sea; not at a dock, but at sea; do you attempt to read the drafts of the ship from the pilot launch? A No. Q Why not? A Well, when you're boarding a ship out in -- THE COURT: He doesn't want to drown. (Laughter.) MR. O'CONNOR: Exactly. THE WITNESS: Yes. BY MR. O'CONNOR: Q Other than drowning, why not? A Well, you know, you can look at the ship from the Pilot boat. Q Right. A The ship is still moving as you're

boarding these ships, they're still moving through the water. Our typical boarding speed is six to eight knots. You've got weather, you've got waves, there's -- the ship has got motion in the seaway, you can't read the draft marks accurately when you're boarding a ship like that.")

<sup>517</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 76:17-20 ("A It has to. Q And, by the way, do you have any experience with river transits as opposed to harbor? A Yes.")

<sup>518</sup> Trial Tr. Day 2, September 22, 2010, Teal at 102:8-20 ("Q Yes, if you could go to page 60, line 7. This is from your deposition in March of 2007. "Question: That's not a very good question. When you had the initial exchange with the captain, did that discussion include anything to do with calculations that the ship had done regarding under-keel clearance for the transit up the river? "Answer: I don't recall that, no." Did I read that correctly? A The ship's calculations you're talking about? Q That's correct. A That's correct, because our conversation superseded that. I guess he didn't see any reason to inform me of that.")

<sup>519</sup> Trial Tr., Day 2, September 22, 2010, Teal, at 25:2-6 ("Did you consider whether or not squat would be a problem with respect to bringing the Athos up the Delaware? A No, I've had panamax vessels before under similar conditions and I didn't anticipate any problems with it, at all.")

<sup>520</sup> Trial Tr., Day 2, September 22, 2010, Teal, at 27:5-10 ("Q So, then your final opinion was what? A The draft of the vessel and the stage of the current and weather conditions and I anticipated negligible squat on the ship. It was, I decided that we had no problem in going and conveyed that to the captain and there was no -- there was no concern whatsoever and no dispute of that.")

<sup>521</sup> Trial Tr., Day 2, September 22, 2010, Teal, at 33:7-8 ("Q Did you consider squat? A I considered it.")

<sup>522</sup> Trial Tr., Day 2, September 22, 2010, Teal, at 103:15-18 ("A The only thing I can say is I'm always concerned about that and then, of course, it was dismissed after I found out the handling characteristics and the conditions of what was going on with the ship.")

<sup>523</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 28:10-30:1 ("Q Well, are you able to tell if a ship is experiencing squat, despite your expectation? A Yes, very easily. Q How? A Once we enter the restricted channel, the ship that's going to experience excessive squat will start to stress right away. Q Have you experienced that before on a ship? A Yes, on many large ships. THE COURT: Experience squat and what? THE WITNESS: Experience stress, vibrations, Captain. MR. O'CONNOR: Judge. THE WITNESS: Judge. MR. O'CONNOR: You're the captain, he's the Judge. Q Captain, I'm pointing to a circle that we've marked on the ship's navigation chart. Is that basically the entrance to the navigation channel? A Yes, it is. Q Okay and just for orientation purposes, what's the buoy that's on -- A Beacon Number 9, Brandywine range. THE COURT: (Inaudible). MR. O'CONNOR: Pardon? THE COURT: I'm asking him a question. What causes the vibration that you mentioned? THE WITNESS: On a ship, when the squat does become a factor and the keel may be getting too close to the bottom, the ship will start to vibrate. THE COURT: What causes it to vibrate? THE WITNESS: A lack of water and the wheel trying to pull more water out from under the ship. Q Were you able to determine, once the ship entered the navigational channel, whether or not squat was a problem with the Athos? A There was no indication of a vibration or anything. No loss of -- no increase in power, no temperature increase or anything. THE COURT: How did you answer that, yes, you were able to determine that and the answer is there was no problem. THE WITNESS: There was no problem.")

<sup>524</sup> Trial Tr., Day 2, September 22, 2010, Teal, at 37:2-11 ("Q Okay. You've talked about -- you gave some testimony, a few minutes ago, that you have been on ships that have experienced squat and vibrations of the hull, right? A Correct. Q Okay, now, as a pilot, if you experience that phenomenon, is there anything you can do to deal with it? A Well, the problem is usually immediately alleviated by reducing speed, which dramatically reduces the problem. Q Have you done that before? A Many times.")

<sup>525</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 76:9-12 ("Q Did you have a specific discussion with the captain about how much tide would be available at Paulsboro upon the arrival of the Athos, at that point? A No, we didn't.")

<sup>526</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 173:6-12 ("Q If the pilot checked the actual state of the tide, at the tide gauge at the boat dock, which he took out to meet the ATHOS down at the pilot station, does that give him



any indication as to what the actual state of the tide is going to be eight hours later, up at Paulsboro, 80 miles up the river? A No, it does not.")

<sup>527</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18 ("Q What did you do when you got on the bridge? A Greeted the captain. Q Did you have a discussion with him? A Immediately. Q What did you talk about? A The condition of the ship and all systems, whether they're functional or not. And I asked his draft after that and he told me the fresh water draft would be 36 feet, six inches on arrival in fresh water and at the terminal.")

<sup>528</sup> Trial Tr. Day 13, October 13, 2010, Markoutsis, at 191:20-192:4 ("Q Okay. How long have you been a mariner? A I have been from 1985. Q Is that when you first went to sea as an officer? A The first year as apprentice and then officer. Q Okay. Did you serve as a second officer? A Yes, sir, I do it for five years. Q And did you also serve as a chief officer? A Yes, sir, another five years. Q And how long have you sailed as a master or captain? A For the last nine years, since 2001.")

<sup>529</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 20:10-18 ("Q What did you do when you got on the bridge? A Greeted the captain. Q Did you have a discussion with him? A Immediately. Q What did you talk about? A The condition of the ship and all systems, whether they're functional or not. And I asked his draft after that and he told me the fresh water draft would be 36 feet, six inches on arrival in fresh water and at the terminal.")

<sup>530</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 34:1-7 ("Q Your discussions with the captain took -- A Were ongoing as I relieved him of command, as he wished. Q Did you just have one conversation about the navigation of the vessel when you boarded the ship, with the captain or did you have more than one conversation? A It was just an ongoing conversation. Whenever he would have a question, it would be answered.")

<sup>531</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 70:6-16 ("Q So, you've met the master, you asked him about the draft and whether there are any mechanical problems, correct? A Correct. Q And that was the extent of the master/pilot exchange? A No. Q What else did you ask him? A I told him that I had ascertained the tide predictions and the state of the current and the state of the tide, at the moment and with his draft, that the squat of the ship should be negligible and that I anticipated about a one and a half to three meters for the entire trip and possibly more.")

<sup>532</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 76:13-20 ("Q So, the master did not know that your plan was to proceed to Paulsboro on a falling tide? MR. O'CONNOR: Objection, your Honor. THE COURT: Overruled. THE WITNESS: He knew very well that we weren't going up on a flood current, at rising tide, because I explained it to him and I explained the under-keel clearance and he agreed and we went.")

<sup>533</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 78:1-3 ("Q Did you discuss the speed of the ship with the master before proceeding? A Yes.")

<sup>534</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 83:5-84:14 ("Q Okay. Now, one of the advisories in effect, at the time the Athos went to Paulsboro on November 26, 2004, was number four. That states, "All vessels over panamax size, having a draft in excess of 35 feet, 6 inches, shall transit on flood tide only." THE COURT: That's what it says. MR. McCauley: Okay. THE COURT: Spending time going over this, will be wasting your time. Q Did you specifically consider that advisory at the time that you decided to proceed with this voyage up river? A You're talking about line four? Q Yes. A Well, I dismissed it, we're under panamax. THE COURT: He's talking about paragraph four, not line four. THE WITNESS: Paragraph four. Q Did you discuss the contents of paragraph four with the captain of the ship? A In certain terms, yes. Q Did you tell him that -- well, strike that. As I")

<sup>535</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 93:12-15 ("Q Earlier you testified that the initial master/pilot exchange consisted of the master telling you the draft and telling you that there were no machinery or equipment problems on board the vessel, correct?")

<sup>536</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 93:19-24 ("Q Okay, did you have a detailed discussion of the various channels you would be moving through, the controlling depths, the under-keel clearance that both you and the captain anticipated during the passage, at that time? A We anticipated the under-keel clearance, as I had stated before, for the entire transit.")

<sup>537</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 101:14-102:7 ("Q I believe you testified that you discussed with the master, under-keel clearance, is that correct? A Yes. Q If you could look at page 63, line 24, first. "Question: I asked you about the mental calculations of under-keel clearance that you did when you boarded the

vessel, saw the pilot card, drew on your experience. Did you have a discussion with the master about that? "Answer: No." Is that the testimony you gave at your deposition two years ago? What I had a discussion with the captain was the clearance that was going to be available going up the river concerning the ship. THE COURT: Did you discuss your mental calculations with him? THE WITNESS: I discussed that I had determined that that would be the case.")

<sup>538</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 103:3-18 ("Q If we could put up page 77 and 78, 22 to three. "Question: I asked you earlier whether you asked for or were provided any information about the squat characteristics of this vessel. You said no. Is that something that you would not be concerned about as a pilot aboard the Athos? "Answer: I would be concerned. That would be in my general feeling of wanting to know on any vessel." Is that a correct statement of your testimony today? A That's a correct intention of how I feel about it, yes. Q Is the testimony, as it appears in this transcript, correct? A The only thing I can say is I'm always concerned about that and then, of course, it was dismissed after I found out the handling characteristics and the conditions of what was going on with the ship.")

<sup>539</sup> Trial Tr. Day 2, September 22, 2010, Teal, at 93:1-7 ("Q Okay. How long did the master/pilot exchange, at Cape Henlopen or off Cape Henlopen, at the pilot area, take? A A few minutes, in the beginning, but then it was ongoing through the route. We needed to get the ship moving or do something with it. And that's what we did and then the passage plan and any other discussion is an ongoing thing, all the time, all the way up the river.")

<sup>540</sup> Trial Tr. Day 8, Bethel, Day 8, at 10:20-12:4 ("Q When you boarded the ship what did you do? A I had a pilot-to-pilot conference with the river pilot, Captain Howard Teal. Q Okay. Do you remember what you discussed? A Yes, I asked him the deep draft and he told me that it was 36 inches -- I'm sorry -- 36 feet, six inches. And he the ship took a lot of wheel when the ship was at slow speed to keep her steady. Q Is that unusual? A No, it is not. Q Okay. Did that in any way impact your planning in terms of how you were going to dock the ship? A Not at all. Q Did he tell you anything else? A No. Q Did he give you the ship's course? A No. He just said she steadied up, I looked, I seen that she was on the range lights. Before he gave me the ship I had a pilot-to-master conference to explain to the captain where I'd be placing the tugs. Q Uh-huh. A That the tugs would each be giving the ship a tugs line. I explained to him the mooring arrangements, that he'd be giving the dock spring lines first, forward and aft, then breast lines, the bow lines and stern lines. I also told him how I'd approach the dock. And I had an apprentice with me and I was explaining to the apprentice where I'd want the ship to be before I turned the ship. THE COURT: Did the captain speak English? THE WITNESS: Yes, he did. THE COURT: Thank you. BY MR. O'CONNOR: Q When you were explaining your maneuvers to the apprentice was the captain also standing there? A Yes, he was.")

<sup>541</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 65:2-66:10 ("Q Is that what you assume when you formulated your plan to dock the ATHOS? A That's the plan I formulated when I was thinking of the times when I got the call at home and looked at my tide booklet that it was going to be a full moon. But when I reached Navy Yard, you know, I checked the piers, I looked at Tinicum Island's, you know, upper shoal. It didn't seem to be off as much as I thought. MR. DeGIULIO: Could you pull out of this, please? Not -- just pull back, go down, please. BY MR. DeGIULIO: Q Captain Bethel, you testified earlier today about -- MR. DeGIULIO: Your Honor, I'm pointing to the chart and not the witness. BY MR. DeGIULIO: Q -- about this shoal here? A Yes. Q Tinicum or Hog Island shoal you call it? A Tinicum Island shoal. Q Yes. And when you boarded the ATHOS it was November and it was about 8:30 at night, right? A Yes. Q And you say you looked at the shoal to check the state of the tide? A Not when I got on the ship, when I was on the tugboat waiting for the ship. Q Was it dark at that time? A Yes. Q How did you -- how were you able to see the state of the shoal in the dark? A You're sitting up in a tugboat looking out a wheelhouse, it's -- there's a full moon, you can see the ripples upon the shoal, beside the shoal. You can look at the Kenob dock or Vallero Paulsboro as well.")

<sup>542</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 8:4-17 ("Q On the night of the 26th did you observe what the tide was actually doing that night? A Yes, I did. When I boarded the tugboat, the SURREY MORAN, from the Naval Base I looked at the jetties, the buoys. I also looked at -- THE COURT: Well, excuse me. The buoys wouldn't tell you the depth of the water, would they? THE WITNESS: No, they would give you the current if you look for a tail on either side of them. I also looked at the shoal above Tinicum Island to see if there was a greater exposure than normal. Sometimes if the wind blows for three, four days out of the northwest you'll see much more of the shoal pronounced than what was that night which was about the same as normal for low water right there at the upper end.")

<sup>543</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 9:5-20 ("Q Okay. Now you mentioned that you look at the shoal on Tinicum Island, is that what we've marked as No. 3? A That's correct. Q Were you able to see that? A Yes. Q How was visibility that night? A Excellent. Q Okay. And did you observe anything abnormal about the tide when you looked at the water line on the shoal on Tinicum Island? A No. Q Did it appear normal to you? A Approximately. Q Okay. So did the actual tide give you any concern about the upcoming maneuver that you planned to take? A No.")

<sup>544</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 64:22-65:9 ("Q Okay. When you boarded the ATHOS in Billingsport Range you assumed, based on your experience, that the actual height of tide would be one foot lower than predicted because of a full moon, right? A I estimated it could be off as much as a foot. Q Is that what you assume when you formulated your plan to dock the ATHOS? A That's the plan I formulated when I was thinking of the times when I got the call at home and looked at my tide booklet that it was going to be a full moon. But when I reached Navy Yard, you know, I checked the piers, I looked at Tinicum Island's, you know, upper shoal. It didn't seem to be off as much as I thought.")

<sup>545</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 68:1-6 ("Q And after the incident you also learned that the actual height of tide measured by the tide gauges in the river showed that the height was in fact one foot less than predicted, just as you had assumed based on your experience, correct? A I don't think it was.")

<sup>546</sup> Trial Tr. Day 21, November 3, 2010, Cole, at 109:25-110:10 ("Q Okay. So a docking pilot in Philadelphia, getting ready to go on to the ship, looks up the predicted tides. He's going to see that at 19:30 the predicted tide was .24 feet above MLLW, and if he happened to be standing there at the dock early, waiting to go out to the ship, he would have noticed that the actual tide was spot on, correct? A Right. Q If we went to -- if he didn't get to the dock until 20:00 hours, he would have seen that it was .03 feet. Essentially it's MLLW, correct? A Right.")

<sup>547</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 80:7-82:9 ("Q Prior to the ATHOS you were aware that the Army Corps of Engineers conducted hydrographic surveys of the Mantua Creek Federal anchorage, right? A Yes. MR. DeGIULIO: Could you bring up D-1174? BY MR. DeGIULIO: Q Do you ever -- do you recognize this as something called a Channel Statement that's published by the Army Corps of Engineers? A Yes, survey, yes. Q And do you understand that these channel statements published by the Army Corps provide depths for the Federal channels and anchorages that the Army Corps surveys? A Yes. Q Prior to 2004 did you routinely review channel statements from the Army Corps of Engineers when they were published? A Yes. MR. DeGIULIO: Could you highlight the bottom tier of this, please? A little more. BY MR. DeGIULIO: Q And on this channel statement there are depths given for each of the four Federal anchorages in the river, right? A Yes. Q And is that something you reviewed as a docking pilot prior to your work on the ATHOS? A Yes. MR. DeGIULIO: If you could highlight the Mantua Creek in yellow, please? BY MR. DeGIULIO: Q This is the Federal anchorage No. 9, right? A Yes. Q Federal Martin Mantua Creek. This channel statement was published in January 2004. Do you see the numbers in the right-hand three columns? A Yes. Q 37.4, 36, 40.4? A Yes. Q What information does that convey to you as a docking pilot? A Certain soundings in the anchorage. Q Okay. So this channel statement from the Army Corps showed depths of 37.4 feet, 36 feet and 40.4 feet, correct? A Yes. Q Had you looked at this channel statement before you boarded the ATHOS? A I've seen it. Q So you were aware that there were depths of 36 feet in the Federal anchorage according to the Army Corps of Engineers? A Yes. Q Did you take that into account when you took the ATHOS into the Federal anchorage on November 26th? A No.")

<sup>548</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 81:2-82:9 ("Q And on this channel statement there are depths given for each of the four Federal anchorages in the river, right? A Yes. Q And is that something you reviewed as a docking pilot prior to your work on the ATHOS? A Yes. MR. DeGIULIO: If you could highlight the Mantua Creek in yellow, please? BY MR. DeGIULIO: Q This is the Federal anchorage No. 9, right? A Yes. Q Federal Martin Mantua Creek. This channel statement was published in January 2004. Do you see the numbers in the right-hand three columns? A Yes. Q 37.4, 36, 40.4? A Yes. Q What information does that convey to you as a docking pilot? A Certain soundings in the anchorage. Q Okay. So this channel statement from the Army Corps showed depths of 37.4 feet, 36 feet and 40.4 feet, correct? A Yes. Q Had you looked at this channel statement before you boarded the ATHOS? A I've seen it. Q So you were aware that there were depths of 36 feet in the Federal anchorage according to the Army Corps of Engineers? A Yes. Q Did you take that into account when you took the ATHOS into the Federal anchorage on November 26th? A No.")

<sup>549</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 95:4-12 ("You were asked a couple of questions about channel statements and shown some depths in the Mantua Creek anchorage 36, 37 foot depths, where are they in the

anchorage? A The northern end of the anchorage where the tug and barges anchor up off of the Amer (ph.) dock. Q When you berth a ship at Citgo do you have any reason to go into those areas at the northern end of the anchorage? A No.")

<sup>550</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 102:14-103:2 ("Q Okay. And are there depths that are less than 40 feet in this survey of the Mantua Creek anchorage? A Yes. Q And generally, where are they in the anchorage? A Principally, up in this northern part, there a -- that's the 40-foot contour and everything within that is shallower than 40 feet. Q All right, can we back back out of this? A There are a couple other spots up here, one there and one there, they're just one -- I think they might be just one reading or two readings that are less than 40 feet. Q And how close -- is this area anywhere near the Citgo terminal? A No.")

<sup>551</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 101:8-10 ("Q In November, 2004, what was the project depth in the Mantua Creek anchorage? A 40 feet.")

<sup>552</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 108:24-109:9 ("Q I would like you to look at a document we're going to bring up on the screen. This is F-ACE-343. What is this table? A This is a channel statement that the Corp of Engineers develops and puts out to the maritime community. This one is from January, 2004. Q And what general information does a channel statement provide? A The channel statement will provide the minimum depths in a particular range or anchorage in the Delaware River, in certain locations, as depicted on the chart.")

<sup>553</sup> Trial Tr. Day 10, October 6, 2010, DePasquale, at 111:13-112:7 ("Q What does this chart say the project depth for the Mantua Creek anchorage is? A 37 feet. Q Is this correct? A That's wrong. Q And why is it wrong or why is it on the chart if it's wrong? A Well, it's just a mistake. The Mantua Creek anchorage was authorized to 40 feet in, like, 1958. So, whoever was drafting this particular form up and that's the part of the form we generally never change, just put the wrong number down. Q When did the corp last dredge the Mantua Creek anchorage? A The last time we dredged it, well, we did a portion of it in 2009, but before that, the last time was 1984. Q Did the corp ever correct the authorized depth listed on this channel statement from 2004? A Yes. Q When did they correct it? A 2005.")

<sup>554</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 47:25-48:4 ("Q How did you arrive at that estimation? A From seeing low water at Billingsport Range at 19:55 and from docking ships for a while and running tugboats for many years you kind of know how long slack is and the beginning of flood is.")

<sup>555</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 10:23-11:7 ("Q Okay. Do you remember what you discussed? A Yes, I asked him the deep draft and he told me that it was 36 inches -- I'm sorry -- 36 feet, six inches. And he also told me that the ship took a lot of wheel when the ship was at slow speed to keep her steady. Q Is that unusual? A No, it is not. Q Okay. Did that in any way impact your planning in terms of how you were going to dock the ship? A Not at all.")

<sup>556</sup> Trial Tr. Day 8, October 4, 2010, Bethel, at 24:23-25:1 ("Q Okay. And when you boarded the ATHOS the master and river pilot informed you that the vessel's draft was 36 feet, six inches? A That is correct.")

<sup>557</sup> Trial Tr. Day 34, December 2, 2010, Betz, at 75:6-76:13 ("Q All right. We talked a minute about the information that you expect a Master to convey to the Pilot, now I want to ask you the opposite question; what information would you expect that a Pilot would give to the Master? A Well, the typical exchange is -- when you get a board is -- you might confirm the berth of destination, because sometimes that's not entirely certain, you may say this is where we're going to go. You've given him some information as far as when -- as far as a time of -- estimated time of arrival, either if you're going to board another Pilot, when you're going to board the other Pilot or when you're going to arrive at the berth. You'll give him some kind of an estimate regarding your anticipated clearance, water depth available -- you know, water under the vessel, that's what I mean to say; not water depth, but water under the vessel as far as clearance. You give him an indication of any traffic that you anticipate, vessel traffic or any other problems you might encounter along the way. Q In your experience, either in Master-Pilot exchanges that you've participated in or those that you have observed, is the term, quote, "under-keel clearance," close quote, always used? A You know, it could be used, but typically it's not. I mean, when we board a ship, you know, I'm dealing with a Chinese Pilot or some other national -- or, excuse me, a Chinese Master or some other nationality and English is their second language, we try to keep our discussion fairly simple and straightforward. And I may use a term like, I may say, Captain, you're going to have four to five feet of water beneath the vessel or



under the vessel, or I may say, you know, you're going to have five feet of clearance, I could use terms like that. We don't typically use the term, "under-keel clearance."")

<sup>558</sup> Trial Tr. Day 13, October 13, 2010, Markoutsis, at 214:5-216:13 ("Q And was the form that he filled out the passage planning record? MR. WHELAN: Objection, leading, your Honor. THE COURT: Of course he is. Go ahead. BY MR. LEVY: Q Was it completed in full before the vessel sailed from Puerto Miranda? A No, it was not full. Any information we have till that moment, it was uncertain, and that's why I say -- I say before draft. This form must be -- it's a record, so until you end the voyage, you have to add things on it. Otherwise, cannot complete it. Q What kind of things do you add to the passage planning record? A For example, during the voyage there is a drill, a Navy drill you have to change your course. You cannot pass from the drill area. You have to update the form. You have to have what is planned, and then you have to copy new information inside the record. On the arrival, in many cases you have anchorages, you have to stay at the anchorage, so you have to update the date of the tide, the time of the tide, and this kind of informations -- Q What about -- A -- which you don't know at the loading port before you sail. Q What about things like when the pilot boards or disembarks, or the speed during a pilotage, are those things that are added to the passage plan form before the ship sets sail from Puerto Miranda or after the event occurs? MR. WHELAN: Objection, leading. THE COURT: Well, that one doesn't lead. THE WITNESS: Excuse me, I don't -- repeat, please? (Pause.) For Puerto Miranda you mean? BY MR. LEVY: Q Yes. A Before we sail, no. Before we sail, I don't understand the question. Q Okay. A I don't -- Q I'll -- A -- the translation was not so -- I don't hear you also. Q All right. I'll rephrase the question. Does the passage planning form require that certain information be recorded after the event occurs, such as pilot boarding? A Yes, yes, of course. You don't know the exact time of the pilot boarding time. First the pilot must come aboard and then you have to record, we keep record of this time. Q Now, did you sign this passage planning form, the draft that you talked about, before the ship set sail from Puerto Miranda? A No, I don't -- I cannot sign. As I say, this is a draft form, so during the voyage, you have to add some information in it. I cannot sign a blank, almost blank form. I have to -- I have to wait to -- this form to be completed, and then I have to sign it.")

<sup>559</sup> Trial Tr. Day 14, October 14, 2010, Markoutsis, at 125:10-127:4 ("Q And it's your belief and understanding that during the voyage in question it was not company policy that this form, which is VOPB-11-A, be completed before departure from any port, correct? A No, I don't say that. I say that we have to prepare a sailing plan on the charts and this -- this form is -- the ship's Master prepare on this form in draft. At the end of the voyage, he have to fill it up correctly, insert all the available information, and then -- Q So, my question is not half-filled, it was your belief and understanding that this form, VOPB-11-A -- MR. WHELAN: -- would you bring that up again, which starts at Page 718? -- BY MR. WHELAN: Q -- that that form did not have to be completely prepared prior to departure and did not have to be signed by you and the other officers prior to departure, is that correct? A Yes, sir. MR. WHELAN: And if we could -- THE WITNESS: Some information in this form get filled up, other information cannot, we don't -- they are not available. MR. WHELAN: And if we could bring up the signature page on that? Back one, back one, right there. BY MR. WHELAN: Q And in the lower part under, "Acknowledgment," there's an area for to be approved by the Master, to be signed, correct? A Yes, sir. Q And it's your understanding you didn't have to sign that before a ship would leave the loading port, correct? A Yes, because the form is blank, some areas are blank, I cannot sign a blank form. Q Okay. Because the Second Officer didn't fill it out? A No, no, because we have information from -- also from the discharging port. Q And prior to departure from Puerto Miranda on November 20th, 2004 this form was not completed and signed by you before the ship sailed, correct? A It was completed, all the information we knew at that time was completed in draft form, but not signed, yes. Q But not everything in that plan was filled out before you left Puerto Miranda, correct? A Not everything, because there are some informations, as for example ETA changes at the discharging port, you cannot -- it's not -- you cannot imagine things to write in this form.")

<sup>560</sup> Trial Tr. Day 19, October 25, 2010, Morrison, at 167:19-168:10 ("Q Okay. Who determines whether a responsible party is entitled to this limitation of liability at the National Pollution Funds Center? A I make that determination. THE COURT: Is there a procedure that's followed? THE WITNESS: Yes, sir. BY MR. FLYNN: Q Can you tell us about that procedure? A Under OPA there's clear requirements and really there's three determinations or three steps, three elements that are done. The responsible party will have to come in and demonstrate that they're -- that they by gross -- their gross negligence did not proximately cause the release, that no willful misconduct proximately caused the release and that no violation of Federal safety construction or operating regulation was violated, was violated to proximately cause the release.")



<sup>561</sup> Trial Tr. Day 19, October 25, 2010, Morrison, at 170:17-22 (“Q Did the National Pollution Funds Center adjudicate whether the responsible parties for the ATHOS I incident were entitled to limit their liability? A Yes, we did adjudicate that and made a decision. Q And what was that decision? A We upheld their limit.”)

<sup>562</sup> Trial Tr. Day 19, October 25, 2010, Morrison, at 171:1-8 (“Q And what did you base that decision on? And I do not want your analysis but what did you consider in terms of evidence? A The claimant's submission package which was thousands of pages which included vessel documentation, crew documentation and post incident investigation information and I also did, we did external research and then I had some assistance in reports from a couple of Federal agencies.”)

<sup>563</sup> Trial Tr. Day 19, October 25, 2010, Morrison, at 174:9-16 (“Q And were there any particular regulations that you examined to ascertain whether the claimant had complied with? A Yes, sir, there were several that related to depth of vessel, draft of vessel, depth of water, specifically the under keel clearance regulations which I think is 33 CFR 157. And the 46 CFR on the engineering. Q Okay. A And construction issues.”)

<sup>564</sup> Trial Tr. Day 19, October 25, 2010, Morrison, at 175:5-7 (“Q Okay. And what was your determination, was the claimant entitled to limit its liability? A The claimant was entitled to limit their liability, yes.”)

<sup>565</sup> Trial Tr. Day 20, October 26, 2010, Hellberg, at 33:1-34:2 (“Q Were you Supervisor of Claims Managers when the responsible parties for the ATHOS spill submitted their claims to the Oil Spill Liability Trust Fund? A Yes, ma'am, I was. Q What was your final determination with respect to the removal cost claims submitted by the ATHOS responsible parties? A My final determination was that Frescati was entitled to a payment of approximately 88 million beyond their limit of liability of 45.4 million. Q Ms. Hellberg, what do you mean by an adjudication of a claim for removal costs? A An adjudication of a claim for removal costs is when I review all of the documentation submitted by the claimant, as well as governing regulations, and I make a determination of whether the costs are compensable by the Oil Spill Liability Trust Fund. Q And when you say compensable, do you mean reimbursable? A Yes, ma'am. Q And what are removal costs? A Removal costs are the costs for actions to remove oil. Q When is a responsible party, such as Frescati or Tsakos, entitled to recover their removal costs from the Oil Spill Liability Trust Fund? A An RP is entitled to recover their costs once the Coast Guard has made a determination of entitlement to their limit of liability.”)

<sup>566</sup> Trial Tr. Day 20, October 26, 2010, Hellberg, at 42:1-6 (“Q And did the ATHOS responsible parties later submit a second or supplemental claim for adjudication? A Yes, ma'am, they did. Q For about how much? A That supplemental claim was for approximately \$14 million.”)

<sup>567</sup> Trial Tr. Day 20, October 26, 2010, Hellberg, at 43:5-25 (“MS. SHUTLER: Could we have U.S.A. Exhibit 157 at 00090? BY MS. SHUTLER: Q And who drafted this letter here? A I drafted this letter, ma'am, for Tom Morrison's signature, he was Chief of Claims Adjudication Division, making an offer to the RP of approximately 77.1 million. Q And did you receive a supplemental claim from the ATHOS responsible parties? A Yes, ma'am, I did. Q And did you make a recommendation for payment with respect to the supplemental claim? A Yes, ma'am, I did. MS. SHUTLER: Could we have U.S.A. Exhibit 161 at NPFC-00095? (Pause.) BY MS. SHUTLER: Q Is this document your recommendation for how much to reimburse the ATHOS responsible parties for their supplemental claim? A Yes, ma'am, it is.”)

<sup>568</sup> Trial Tr. Day 15, October 18, 2010, Hajimichael, at 83:16-84:15 (“Q Did the U.S. Coast Guard cite Tsakos for violating any laws, regulations, statutes, anything like that? A No, they did not. On the contrary, they congratulated the crew for their swift action and Tsakos for their fullest cooperation. Q Which country was the flag state for Athos I? A Cyprus. Q And did the flag state conduct any sort of investigation? A Yes, they did. Q And did the flag state cite the owners, Tsakos or the ship with any violations of law? A No, they did not. Q Were any criminal investigations started by the U.S. Attorney's Office? A Yes. Q And were the crew and officers subpoenaed to testify? A Yes, they were. Q And did the State of New Jersey, through its Attorney General's Office, also conduct an investigation? A Yes, they did. Q And did the State of New Jersey or the U.S. Attorney's Office, after conducting their investigations, cite the owners, Tsakos or the vessel for violating any operating procedures, laws or regulations? A No, they did not.”)

<sup>569</sup> Trial Tr. Day 19, October 25, 2010, Benson, at 53:12-54:3 (“Trial Tr. Day 19, October 25, 2010, Benson, at 53:12-54:3 (“Q Did O'Brien's receive any kind of a commendation at the end of this case for its response to the spill? A Yes, yes, we did. Q What was that, a commendation of Unified Command? A Yes, it was a commendation

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*presented to us by Captain Sarubbi, who was the Coast Guard Federal On-Scene Coordinator. The citation was directed to the Unified Command and the responders for the ATHOS oil-spill event. Very complimentary, very much appreciated, and it was extended to all the Spill Management Team members and I expressed my -- my concerns for -- not concerns per se, but my expression of thank you to all the contractors as well, and this is a -- this is the citation as it reads. Q So, to be clear, the citation was to the Unified Command? A Yes. Q Of which the RPU were one of the elements? A That's correct.")*